KOSOVO

CLUSTER AND BUSINESS SUPPORT PROJECT

RAW MILK QUALITY

VETERINARY AND ANIMAL HEALTH SERVICES

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PURPOSE OF ASSIGNMENT

This SOW will implement the activities specified under 5.2 of the Dairy Cluster Activity plan [train veterinarians and field men working with milk processors in milk quality standards]. This is the second part of the assignment. Another consultant is implementing the good manufacturing practices at the farm level of this assignment, and this consultant will be working with the dairy cows and farmers on animal health issues that affect milk quality. This assignment is to work in conjunction with activity 5.3 [deliver extension services at farm level to improve raw milk grades and standards]. The consultant for this SOW will work with the local agency that is implementing 5.3 to ensure that their activities reach accepted international standards for testing and treating for mastitis and other animal health issues.

Education and training of cow breeders for good farm management and better production results is primary goal. Farmers will be trained in how to eliminate the production costs raised by diseases, bad feeding, poor hygiene conditions and ignorance to reproduction specifics of this breed of animals.

BACKGROUND

A large number of farms are managed by young inexperienced farmers or by farmers with insufficient knowledge of dairy farm management. This is the leading cause of bad production results, the high cost of production which is crucial to the economic balance of such a farm. The problems that lead to such condition are: high mortality level of dairy cattle and calves, low production of milk per cow due to health problems or improper feeding, a high percent of culled cows due to mastitis and other pathological conditions, reproductive problems caused by varieties of factors among which the most important is bad farm management, poor hygiene conditions at the farm and insufficient pay for milk obtained by these farms.

The Kosovo dairy sector is poised to take a giant step forward in the increased production of high quality milk. This production must be led by increased demand for locally manufactured, high quality dairy products. The dairy sector is a prime example of how an industry must progress in terms of technology and systems, or be left behind in the world market. To launch the dairy industry in Kosovo to the next level of competitiveness, a focused approach that introduces modern production concepts to the dairy producer is critical, leading to larger herds and higher quality milk at the farm level. In order for the locally produced milk to compete with imported milk, the local milk must be at a similar hygienic standard to the imported milk. By improving the quality of milk at the farm level, the ability of the processors to produce high quality milk also increases. This would enable them to be more competitive with imported milk, thereby increasing sales and profits for the processors, which would be passed to the farmers through higher demand for locally produced milk.

There are approximately 155,000 dairy cows in Kosovo. The average dairy farm is 4-5 cows being milked once a day with an average yield per cow of less than 2.7 liters. This dismal yield per cow is in contrast to a number of private commercial dairy farms in Kosovo milking 30-40 head of pure Simmental cows twice a day getting an average of 25 liters per cow per day. Milk production per cow at the small farm level is extremely low because of poor genetics, little or no veterinary care, and the lack of feeding of the animals of high protein feed grains. Locally produced milk also has high plate counts and sediment values, and is not tested for antibiotics or chemical or biological residues. Management productivity

parameters (days open, duration of lactation, age at first calving, etc.) are very low. Additionally, feed prices in Kosovo are some of the highest in the world.

An additional constraint is that Kosovo milk production is based on pasture grazing, thus making it very seasonal. During the summer season, production rises as much as 60% over production during the winter season. Prices paid for milk reflect the seasonal pattern. During the winter and spring, the price paid for milk by the processor is .30€ per liter, which is substantially above the world market price of .24€ per liter. During the summer and fall, when the cows are in full production, the processors are paying .22€ to .26€ per liter. Further, the processors have trouble using all the milk in the summer. Therefore, they are not as vigilant in picking up all of the milk offered by the farmers. The milk that cannot be sold to the processor is sold in the local market for substantially less than .22 € or is used at home to be made into cheese and yogurt to be consumed by the family. This is why it is critical to increase the quality of the milk. There is an over production of poor quality milk, and there is a deficit production of grade A quality milk throughout the entire year. Therefore, grade A quality milk can receive a premium price even during the summer months.

The dairy sector needs to produce safe, high-quality milk products that meet the needs of the consumer. This technical advisor will work with the processors in teaching them how to test and pay for high quality milk. The production of high quality milk will be encouraged by an incentive payment system for raw milk based on objective chemical, physical and microbiological criteria, which the processors are expected to implement in the next six months.

EXECUTIVE SUMMARY

Two Dairy specialists, consultants from Macedonia, joined the three local consultants from Biolab-local consultant agency to provide technical assistance and training and to participate in education of the cow farmers through Kosovo. The consultants worked in five regions-Prishtina, Lipljan, Stimlje, Ferizaj and Prizren-during the period of 20 days (July/August 2005).

The base for the technical assistance was education and training to the cow breeders on farm management and better production results. Large number of farms is managed by young inexperienced farmers or by farmers with insufficient knowledge of farm management of dairy farms. This is the main reason of bad production results, high production costs which is directly correlated with economic balance of such farm. Main problems which lead to such condition are: high mortality level of dairy cattle and calves, low production of milk per cow due to different health problems or improper feeding, high percent of culled cows due to mastitis and other pathological conditions, reproductive problems caused by varieties of factors among which the most important is bad farm management, low hygiene conditions at the farm and low and under pay milk obtained by these farms.

Target group of the project were farms that fulfilled the minimal technical conditions for producing high quality milk, farmers who have invested in purchasing dairy cattle, facilities and other necessary equipment but due to several objective and subjective reasons are not currently producing high quality milk.

During the period of 20 days, training was held at the seven model farms. Almost 70 persons attended the training that is directly involved in the processes at these farms. Farmers were educated on different topics for dairy farm management such as: Good hygiene practice at the farm, management of dairy cows, feeding of dairy cows, mastitis of dairy cows and most important diseases of dairy cows and calves. Proper way of work in order to get high raw milk quality was practically demonstrated using proper equipment, utensils and cleaning chemicals. At each model farm, all cows were tested with CMT, after which, the proper application of the antibiotics for local treatment of cows with sub clinical mastitis was demonstrated. All procedures for which there was a chance for practical demonstration were repeated by the farmers. After the training all farmers receive the basic tools for hygienic milking, tools and cleaning chemicals for cleaning the equipment, CMT-kit, antibiotics for local treatment of the mastitis and basic educational material.

Workshops were held at 7 model farms and approximately 70 farmers attended. The main topic of the workshops was "Production of quality milk" with the following sub topics: Hygiene on farm, milking hygiene, hygiene of the milking and other equipment, cooling of the milk and mastitis at dairy cows. All procedures that are important for production of the quality milk were practically demonstrated. Also, all critical points that affect the microbiological quality of the milk were pointed out starting with preparation of the cows for milking all troughs the sale of the milk. At the end pf the training all farmers received educational material with the procedures for production of quality milk.

At four collecting centres training was conducted for employees that permanently or occasionally work at the collecting centre. The goal was to increase the hygienic level at the collecting centre and to maintain the milk quality up to the moment of delivery to the dairy plant. The following topics were included in the training: choose of proper cleaning chemicals for cleaning the enterer, equipment and utensils; choose of equipment for cleaning the enterer and milk equipment; procedure for cleaning the milk equipment; disinfection of the enterer, equipment and utensils; proper sampling for microbiological and chemical analysis;

application of blue methylene test and evaluation of the results; training for handling with Lacto scan and pH meter.

With the managers of the 3 dairy plants: Rona, Abi and Devoli it was discussed about the need of the implementation of the payment system for raw milk according toe microbiological and chemical quality, influence of microbiological quality of raw milk on the quality of dairy products and their competitiveness on the market. The managers have been shown several models (formulas) for determining the price of the raw milk, considering chemicals and microbiological parameters for determine the raw milk quality. They were also presented with the European standards for raw milk quality for collection and transport and also the standards for premises for intake and further process of the milk. The need for establishing at least one independent laboratory in Kosovo for raw milk and dairy products testing was also emphasized.

The program for educational and training of caw breeders was well received by the farmers and managers of Dairy plants, and provided a valuable opportunity for educational interaction between the farmers, representatives of Dairy plants and consultant team members. Everyone involved learned and benefited from this experience. It was unfortunate however, that the regional veterinarians did not participate in the outreach program and that the Veterinary Institute in Prishtina was not involved. These alliances are important to the development and long-term stability of programs such as the program for educational and training of caw breeders.

FIELD ACTIVITIES TO ACHIEVE PURPOSES

The aim of the project is to improving the farmers' skills in farm management for quality milk. Project task is to perform education and training of cow breeders in several issues regarding farm management. Target group of the project are farms that fulfilled the minimal technical conditions for producing high quality milk. Farmers who have invested in purchasing dairy cattle, facilities and other necessary equipment but due to several objective and subjective reasons are not currently producing high quality milk. The consultant shall:

- Identify farms with significant production capacities which have the essentially required conditions for high quality milk production;
- Educate farmers through training for high quality milk production from the individual animal;
- Conduct milk quality control through testing the milk from individual animals for mastitis;
- Train the dairy farmer in proper health maint4ence practices to treat and prevent mastitis.

The expected outcomes at the farm level are:

- Raw milk production complying with grade microbiological and chemical quality standards.
- Total bacteria count lower than 500 000 per ml.
- Somatic cells presence not higher than 400 000 per ml.
- Negative test results for antibiotics and other inhibitors' presence
- acidity not higher than 7.6 SH degrees;
- No added water, that is freezing point not higher than -0,530˚C;
- Milk density within limits from 1.027-1.035 kg/m^3;
- Minimum 3.2 % milk fat;
- Minimum 3.0 % protein presence
- Minimum 8.5 %; dry matter presence (devoid of fat)
- Specific taste, color and scent presence

TASK FINDINGS AND RECOMMENDATIONS

Training on model farms:

At 7 model farms, farmers were trained for: production of milk with high microbiological quality, testing and treatment for sub clinical mastitis, feeding regime for dairy cows according to lactation phase, management on reproduction and prevention of diseases at cows and calves.

Activities at each model farm were proceeding by the following schedule:

1. ***Inspection on farm's premises:***

   At each farm inspection was done in order to record the defects at the premises, degree of ventilation and lightening inside of the premises, convenience of beds, convenience of waste disposal system, system for drinking water, defects of the system and equipment for milking and defects in farmers' work at the farms.

2. ***Hygiene of milking and other dairy equipment and utensils:***

   On farms, by using adequate tools and chemical solutions, we have practically demonstrated proper operating procedures pointing toward high quality milk production. The proper cleaning procedure for cleaning milking machines, milking containers, lacto freezers and milk transportation tanks, were demonstrated. The milking machines were completely disjointed and washed by using proper cleaning brushes and a 0,5 % water solution of alkaline detergent (Alfa Laval). The temperature of the solution was at least 65˚C, in order to remove the milk fat layers. Then the whole equipment was washed with gushing water. The same cleaning procedure was applied to the milking containers and lacto freezers. Washing of the equipment with an acid detergent followed, for the purpose of eliminating the milk stone from the surface of the equipment. The whole equipment was again rinsed with gushing water, after which it was disinfected by using a chlorine solution (sodium hypo chloride). The equipment was rinsed once more with gushing water. During the demonstrative washing of the equipment, we have pointed out all places and factors influencing and enlarging milk contamination. After that, we have examined the number of pulsations (normally it should be 50 – 60/ minute) and vacuum in the tits cups (normally should be 48-50 Pa).

3. ***Hygiene of milking:***

   The next procedure was a demonstration of proper way of milking. The proper procedure of washing and disinfecting the udder was demonstrated (Cetavlon-Pliva), and tits drying by using paper tissues. The first milk spurt was milked in a separate container in order to avoid collective milk contamination. After milking, each tit was disinfected by using iodine disinfecting solution (Prodip-De Laval).

4. ***Testing for mastitis:***

   The procedure of identifying dairy cows diseased with sub-clinical mastitis using the California Mastitis Test was also demonstrated. Different levels of sub-clinical mastitis with dairy cows were determined and method of treatment of diseased dairy cows was explained and demonstrated.

5. ***Cooling of the milk:***

   At 4 farms that were not equipped with the lacto freezer we demonstrated several ways of cooling the milk. By cooling the milk below 8ºC increasing the number of

microorganisms is limited and its microbiological quality is maintained until sell or distribution. Vessels for milk were put in bigger vessels filled with water trough which cold tab water passes or between two vessels bottles with freeze water were placed. Occasionally, milk was mixed in order to balance the temperature in the vessel with milk.

Workshops:

At 7 model farms workshops were performed at which 70 farmers attended that were cooperants of Rona, Abi and Devoli diary plants.

Main topic of the workshops was good hygiene practice on the farms in order to produce milk with high microbiological quality. Practically, demonstration was done on all significant procedures for production of quality milk:

Proper ventilation; cleaning and disinfection of the beds; preparation of the udder for milking (disinfection and drying of the udder); milking of the first spouts of milk; proper positioning of the milking units; control of the vacuum and number of pulsations in the milking system; disinfection of the udder after milking; proper choose of cleaning chemicals and equipment for cleaning; proper procedure for cleaning the milking equipment; control of the parts of the milking equipment; testing the cows of sub clinical mastitis with CMT and proper evaluation of the test results; local treatment with antibiotics of the cows with sub clinical mastitis and ways of cooling the milk.

During the training, all critical points that affect the microbiological quality of the milk, starting with preparation of the cows for milking and ending with the distribution of the milk, were emphasized.

For each procedure it was explained why it should be done and its affect on the milk quality and health condition of the cows.

At the end of the training all attendants were given educational material containing the procedure for production of the quality milk.

Training at the collecting centres:

At 4 collecting centres training was performed for employees that occasionally or permanently work at the collecting centre. The goal was to increase the hygiene level at the collecting centres and to maintain the quality of the milk until distribution to the dairy plant.

On the training, demonstration was performed on:

1. Proper sampling and labelling the samples of the milk for chemical and microbiological analysis, storage on the refrigerator on 0-4^{o}C and transport of the samples on the temperature of 0-4^{o}C in sterile and well closed containers;
2. Control of the temperature during intake of the milk from the farmers;
3. Choose of cleaning chemicals for cleaning and disinfection of the premises, equipment for storage the milk and other assisting utensils;
4. Introduction with the procedure for cleaning and disinfection of the premises and equipment at the collecting centre;
5. Introduction with the test methilene blue as orientation control of the microbiological quality of the milk: preparation of 0, 1% solution of methilene blue, testing of the milk, evaluation of the results from testing and classification of the milk according the test;

6. Preparation of the alcohol test for determining the freshness of the milk: preparation of 68-70% solution of ethyl alcohol, testing of the milk and proper evaluation of the results form the test;
7. Usage of Lacto scan for determination of the chemical parameter of the milk, proper evaluation of the results and procedure for cleaning the instrument;
8. Usage of pH meter: calibration of the instrument, testing the milk, evaluation of the results and cleaning of the probe of the instrument;
9. Preparation of the titration method with the solution of NaOH for determining the acidity of the milk: preparation of the solution NaOH, testing the milk and evaluation of the results form the test.

CONCLUSIONS

Evaluation of current situation on farm level:

During the project implementation, we have visited 12 farms in Kosovo. Based on results from surveying the farmers and from working directly with them, we came to the following findings:

- Farmers do not pay attention on satisfying the general principles and normative when building the premises.
  - Ventilation system is inadequate and causes increasing in the concentration of harmful gases inside the premises (CO_2, ammonia,) increasing the percentage of moisture that has harmful effect on the health of the animals and their production characteristics;
  - The beds are not properly designed which lead to injuries of the joints, toes (ungulate) and udder;
  - Waste disposal in most of the farms is inadequate and the beds are constantly moist, that leads to infection of the udder. In such circumstances cleaning of the beds and farm in general is more difficult;
  - Calves are kept in the same room with the dairy cows. Moist floors, high concentration of moist, ammonia and CO_2 lead to diarrhoea and pneumonia at calves;

- Hygiene at the premises in on low level:
  - Hygiene at the premises is done only by waste disposal and disposal of dirty litter. No cleaning and disinfection of the beds and pens for calves is practicing;
  - Dezinsection and deratization in not performed.

- Hygiene of the milking and equipment for milking is on low level.

  Farmers know very well the meaning and influence of the hygiene to the quality of the milk and health condition of dairy cows:
  - Before milking, farmers do not prepare the udder in a proper manner and do not use any solutions to disinfect the udder. The procedure they usually apply is occasional washing of the udder with water, but without drying it, which creates favorable conditions for increased milk contamination, especially with coliform bacteria,
  - They also do not milk the first milk spurt in a separate container,
  - After milking, the farmers do not rinse the tits with an iodine disinfecting solution, which is one of the main reasons for sub clinical and clinical mastitis occurrence.
  - Practically none of the farmers is properly washing and disinfecting the milking tools/equipment (milking machines) and milking containers. They also do not posses adequate cleaning tools and chemical solutions, and usually use the ordinary domestic detergents and sponges for cleaning. This and the previous moments are the critical points initiating major contamination of milk with microorganisms. Total bacteria count in the milk is a result of its contamination during milking, from equipment and utensils or as a result of increasing the number of microorganisms in the milk.
  - Most of the farmers who are using a milking machine, do not know its operations and particular characteristics well (the normal number of pulsations, the normal

vacuum in the tits cups, the preferable time span of using the rubber parts and rubber tubes) which often results with an improper secretion of milk from the udder and sub clinical mastitis occurrence.

- All farmers, without exception, do not know how and are not able to test the cows for presence of sub clinical mastitis. Usually they start treating cows for presence of clinical mastitis, which in most cases causes permanent damage in the functioning of the udder. That, on the other hand, has an economical impact on milk production.

- <u>The feeding of dairy cows usually is not adjusted according to lactation phase.</u>

  For feeding the cows, they use mostly straw, partially grass or grained corn. This type of feeding is only satisfying the energetic needs but not the needs of proteins, vitamins and minerals. As a result, dairy cows can not reach the maximum production capacity (low milking capacity), very often metabolically diseases occur (puerperal paresis and ketosis) and reproductive problems as a results of inadequate feeding. The usage of protein feed and supplement of vitamin and mineral pre mixes is essential in the feeding of high productive breeds of dairy cows.

- <u>Pod dermatitis and arthritis.</u>

  Pod dermatitis at dairy cows kept in the stables is characteristic for farms where no attention is paid on regular cutting of the cornea of the toes (ungulate). In that case, the cornea can not be cut off during walking of the cows so it grows over, it can easily crack and lead to infection. At most progressive cases of pod dermatitis it is necessary to exclude the cows form the production which also causes big economical damages for the farmers. Consequence of the negligees for toes can also be deformation of the legs. During our visit we visit a farm where on this problem was paying a lot of attention.

  Arthritis of the back legs we saw was as result of inadequate beds (short beds with sharp edges towards manure disposal canal) or as result of insufficient quantity of straw litter in the beds. The basic function of the straw litter is to absorb the moisture in the beds, to serve as shock absorber against the hits of the joints when lying down and to serve as thermo isolation layer form the concrete base.

Evaluation of current situation on milk collecting centre level:

The collecting centres for raw milk we visited in the villages of Rubovce, Mamusha, Lepine and Donji Godanc satisfy the basic hygienic criteria for collecting raw milk:

The floor is covered with ceramic plates, cold and hot water is available, waste water disposal and basic equipment for maintaining the hygiene of the premises is also available. The milk is store in lacto freezers where it is kept on proper temperature until delivery to the dairy plant.

For determination of the milk quality only alcohol test is performed with 75% alcohol or titration method with NaOH and indicator colour.

Cleaning of the premises, equipment for intake of milk and utensils is done with ordinary detergents for domestic use and disinfection of the premises and equipment with proper chemicals is not performed.

The temperature of the milk at the intake is not controlled. We also noticed that lost of the farmers are transporting the milk in inadequate vessels, with narrow hols where visual control can not be applied.

RECOMMENDATIONS FOR FUTURE ACTIVITY

Recommendations for farmers:

- **Building farms or adaptation of the existing premises:**
  - When constructing new farm or adapt the existing ones, the farmers should be careful on satisfying the general principles and normative for such objects. In any case they should consult or hire person that has knowledge in this area. If not, any mistake during construction will have negative effect on economical part of the business, productivity and health condition of the cows.
  - Ventilation has to be adapting to the capacity of the farm by constructing properly dimensioned hols for natural ventilation, on both sides of the walls and on the roof. If the natural hols for ventilation are not enough it will be necessary to install electric ventilators. The goal is to lower the concentration of harmful gases inside the premises (CO_2, ammonia), percentage of moisture and temperature to acceptable level. The optimal temperature is 12-14^{o}C, optimal relative humidity 70-80%, concentration of CO_2 0,3% and concentration of ammonia 100 ppm.
  - The beds for cows should be properly dimensioned according to the breed (length of the body). Improperly dimensioned beds are often reason for injuries of the joints, toes and udder. The beds should have incline towards manure disposal canal of 2%.
  - Waste disposal should be properly solved by constructing the canals for disposing the manure behind the bed. At the classic type the width of the canal should be 40-60 cm, and depth 8-25 cm.
  - Keeping of the calves should be in separate room form the cows in order to avoid infection and diseases.

- **Hygiene in the premises**:
  - Hygiene in the premises deserves big attention. Beds for cows should be cleaned several times a day during which, manure and dirty litter should also be changed. Twice of three times per month it is necessary to clean the beds with water and disinfect them with 2% NaOH.
  - Occasionally insects should be destroyed and if needed other pests such as mice and rats.

- **Hygiene of the milking and milking equipment:**

  Preparing the udder for milking:
  - Removal of rough dirt from the udder with tepid water;
  - Disinfecting the udder with a disinfecting solution;
  - Drying the udder with paper towel/tissue;
  - The first milk spurt should be always milked in a separate container (same container for all cows).
  - Before and after milking, the tits should be dipped in/rinsed with an iodine disinfecting solution.

Preparation of milking equipment:

a) Before milking:

- Disinfecting the milking machine, preceding immediately to milking, with a disinfecting solution;

b) After milking:

- Immediately after milking, the milking machine and other containers used during milking, should be rinsed with lukewarm water until the water becomes clear (until clean and pure water is seen);
- After that, an alkaline solution should be prepared (50 - 70 g/10 l. water) and used to wash and rinse the entire equipment. Its temperature should be 60-70°C. Proper cleaning brushes should be used for the washing, and no sponges. Sponges should be pushed out of use. The rubber parts of the milking machine should be cleaned in the same manner.
- After washing with an alkaline detergent, the entire equipment should be rinsed with a gushing water to ensure elimination of any alkaline detergent residue.

This procedure should be repeated every day.

- Once to twice a week, an acid solution should be prepared (50- 70 g/10 l. water) and used to wash the whole equipment. The solution's temperature should be 60-75° C. Proper cleaning brushes should be used for the washing

Controlling the milking machines and their operational characteristics:

- Introduce periodical inspections of the number of pulsations (normally 50 – 60/ minute) and vacuum in the tits cups (normally 48-50 Pa). The rubber part of the tits cups should be replaced after being used 2500 times, or after 6 months.

Milk manipulation after milking:

- Immediately after milking, milk should be strained through gauze, metal or plastic strainers previously disinfected.

Dairy cows testing for presence of sub clinical mastitis:

- Once a month, farmers should conduct dairy cows testing by using quick detecting tests for sub clinical mastitis presence, and provide adequate treatment to the diseased cows.

Milk Cooling:

- In the first two hours after milking, the milk should be cooled down under 8 ºC.

If the milk is delivered in the collecting centre immediately after milking, the cooling is not necessary. The best way for cooling the milk is with lacto freezers.

If the farmers don't have lacto freezers, the cooling of the milk can be done by tab water, ice or freezers for deep freezing. If the milk is cooled by using tab water or ice, the vessels with milk are put in bigger vessel filled with water. In any case, it is necessary to mix the milk in the vessel with water in order to balance the temperature.

Recommendations for the dairy plants:

- Dairy plant's personnel accountable for raw milk quality control should constantly monitor the conditions and operating procedures at the dairy cows' farms as well as milk collecting, transportation and raw milk reception at the dairy plant.
- Conduct continual raw milk quality controls and undertake necessary interventions to improve quality if/when needed.
- The dairy plant should organize frequent trainings and seminars to farmers on subjects related to increased production of improved quality milk.
- Implementation of referent laboratory methods for raw milk and dairy product quality control including the method for determining antibiotics and other inhibitors presence in milk.
- Controlling the level of water and air contamination in the microbiological laboratory prior to conducting each new testing and comprehending the importance of its continual application.
- Establishing a new raw milk pricing system with the introduction of stimulating measures for farmers producing high quality raw milk i.e. milk complying with the high quality milk standards (for example: base price +

	Total bacterial count	Award (prize)/fine
Extra	< 100,000	+12%
1. Class	100,001-500,000	+8%
2. Class	500,001-1.200,000	0
3. Class	1.200,001-2.400,000	- 10%
4. Class	> 2.400,000	- 20%

- Raw milk should comply with other quality standards as well:
  - Somatic cell count (SCC) less then 400.000 per ml;
  - Negative test results for antibiotics and other inhibitors' presence (pesticides, disinfectants etc)
  - Milk should be filtered and without any rough dirt presence on the surface;
  - Milk should have characteristic taste, color and odor;
  - No added water, that is freezing point not higher than -0,530˚C;
  - Milk density within limits from 1.027-1.035 kg/m^3;
  - Acidity should not be higher than 7.6 SH degrees;
  - Minimum 3.0 % protein presence
  - Minimum 3.2 % milk fat;
  - Minimum 8.5 % non-fat solids;
    - The dairy plant should be responsible for supplying cleaning and disinfecting solutions (alkaline and acid detergents), proper cleaning equipment (brushes), milking equipment and spare parts, and raw milk containers to farmers under favorable prices.

Specific recommendations

1. **Alcohol test**

   During our field work we noticed problem that occurs during collection of the raw milk at most of the farmers. Dairy processors use alcohol test with 75% alcohol for testing the freshness of the milk and that is why the number of the positive test is increased. It has to be emphasised that the reason for positive alcohol test not always is because of increased acidity of the milk from bacteriological activity but simply because of increased natural acidity of the milk due to higher content of casein. At increased natural acidity of the milk, the alcohol test with 68% alcohol will be positive but with 75% alcohol, the number of positive tests will be much higher (more than 5% of tested milk samples). This can easily be proven by testing individual cows on mastitis and get negative result but when testing the milk with 75% alcohol immediately after the milking the result is positive due to coagulation. Higher percentage of alcohol can lead to destabilisation of the casein even when the acidity of the milk is normal or slightly increased from the higher content of casein. Because of this practice, there is a double lost, for farmers, whose milk is rejected by the dairy plants and also dairy plants that reject milk with higher percentage of protein. As a solution for this problem we recommend project to be developing that will help the farmers and dairy processors to reduce loses made by rejecting the milk. Interest for solving this problem showed cow breeders association and large numbers of farmers which we contacted during our activities.

2. **New paying system for raw milk**

   The need for successive establishing of new paying system for raw milk according to the microbiological quality is enforced. At the beginning this system would be established for bigger farms and latter, after establishing laboratory that can perform big number of tests for raw milk, for smaller farms.

3. **Laboratory**

   KCBS to stimulate the development of an independent laboratory for testing the raw milk and dairy products. The need for establishing the laboratory comes from following reasons:

   a. Big number of smaller farms and big number of monthly analysis that every dairy plant should perform;
   b. Need for laboratory equipment that every diary plant should poses for chemical and microbiological analysis;
   c. Usage of improper equipment and non standard procedure for analysis of milk and dairy products in the improvised laboratories at the dairy plants and collecting centres;
   d. Insufficient personnel or unskilled personnel at the dairy plants and collecting centres that is responsible for laboratory analysis;
   e. Unskilled sampling of the milk for chemical and microbiological analysis;
   f. Mistrust among dairy processors and farmers for the results performed at the dairy plants;

   Dairy processors, cow breeders association and farmers that we contacted also emphasised the need of establishing an independent laboratory.

4. **Educational travelling and field visits to farms**

Considering that a lot of farms are managed by young inexperienced farmers or farmer with insufficient knowledge of farm management, we think that educational travelling and field visits to farms in some countries in the region such as Hungary or Bulgaria will be useful. Farmers in these countries have almost pass the transitional period and their experiences in profitable farm management also fulfilling the EU standards for quality of the milk will be of great use for the farmers in Kosovo. They will have chance to be introduced to the initial condition in which farmers in the region have been problems they faced and solutions for them.

5. **Establishing of the permanent consultant body for consultant services for farmers with the following priorities:**

Proper construction of the farms.

During our visit at most of the farms we noticed that all premises had defects regarding ventilation, waste disposal, beds' construction, milking systems etc that unfavourable effects on productivity of the cows and their health condition. All defects in the construction additionally burden the economy: additional reconstruction of the premises with additional investments, health problems (mastitis, pod dermatitis, pneumonia, diarrhoea at calves, arthritis, and bad hygienic condition for milk production). We want to emphasise that in this case it is not a matter of lack of money but merely unskilled and insufficient knowledge of zoo hygienic normative for constructing this type of farms.

6. **Feeding of highly productive dairy cows.**

We noticed a lot of defects in the feeding of dairy cows which was a reason for decreased productivity, frequent health problems and reproductive problems. Cows are usually fed with hay; some with pasture and from concentrate most usual are various types of cereals, mostly corn without paying any attention to the protein and energetic value of the concentrate and is the feeding satisfying the needs according to the lactation phase. Farmers also very rarely add vitamin mineral premixes that additionally increase the problem with feeding disorders.

7. **Detection of sub clinical mastitis, prevention and treatment.**

All farmers that we visited without any exceptions were not aware with the nature of sub clinical mastitis; consequences from it, ways for testing, preventative measures and treatment of the sick cows. We suggest more consultant activity on field where farmers can learn trough practical work in facing this problem.

8. **Microbiological quality of the raw milk**

Microbiological quality of the raw milk is on low level. Large number of farmers is not introduced with the term microbiological quality of the raw milk and the way of producing high quality milk. Training in farm is necessary with practical training of the farmers for every phase of production of raw milk and control of the microbiological quality of the milk before and after the training using the method of methylene blue or with laboratory analysis. Training will include farmers that have around ten cows or more and where minimal pre- requisites for hygienic production of milk exists (machine milking system, equipment and cleaning chemicals for cleaning dairy equipment).

KOSOVO

CLUSTER AND BUSINESS SUPPORT PROJECT

AN ANALYSIS OF THE VALUE ADDED TAX ON THE DAIRY INDUSTRY IN KOSOVO

Annexes

Annex I Diary Report on Daily Activities

Annex II PowerPoint Presentation – on CD only

ANNEX I - DIARY REPORT OF DAILY ACTIVITIES

Tuesday 05/07/2005

Places of activities: KCBS office, Dairy plant Devoli-Pech

Cooperants assisting through the daily activities: Piter Dickrell, Lorence Grand Clement-KCBS consaltant, Bunjamin Alili-local consultant of Biolab, Driton Skolori-manager of the raw milk sector of Devoli dairy plant

A schedule of activities for realization of the projected tasks was agreed on the first working day at the meeting in the KCBS office. All the necessary technical pre-requisites for work were discussed.

For implementation of the project, the following dairy plants were chosen: Rona-Ferizaj, Abi-Prizren and Devoli-Pech. It was also agreed that we should give technical support to the local consultancy agency-Biolab which will implement the project for training of 100 farmers from Kosovo for improving the raw milk quality. The goal is to determine are their activities in correlation with accepted (approved) international standards for testing and treatment of mastitis at dairy cows as well as other questions connected with the health condition of the animals. Mr Bunjamin Alili was also present on the meeting as representative from Biolab.

As support to the project "Private cooperative development" that Ms. Lorence runs, it was agreed that training for the employees at two collecting stations for raw milk that are cooperants to the Rona dairy plant should be conducted.

At the meeting it was also agreed that the first phase of the project will consist off:

Evaluation of the existing farms' conditions:

- Total number of farmers the dairy plant cooperates with;
- Problems the farmers are facing in milk production;
- Proper milking techniques;
- Presence and mastitis control on farm dairy cows;
- Determining 7 model farms complying with the elementary conditions for high quality milk production (5 model farms that cooperate with Rona dairy plant and two that cooperate with ABI and Devoli dairy plant).
  (Identification of seven model farms with substantial production capacities that have the basic conditions for production of high quality milk)

In the second phase, training should be conducted at the model farms that will include the following topics:

- Production of quality raw milk:
  - Farm hygiene,
  - Hygiene of the milker,
  - Udder hygiene and milking hygiene,
  - Raw milk cooling,
  - Cleaning of milking equipment
- Management of Reproduction, Feeding Of Dairy Cows, Mastitis on Dairy Cows, Most Important Metabolic Diseases of Dairy Cows, Indigestions, Most Important Contagious Diseases, Most Important Parasite Diseases, Other Important Pathological Conditions, Most Important Diseases in Calves.

The training will consist of theoretical and practical part and printed educational materials for all trainees.

In the third phase, seven workshops will be held at the model farms with 10 to 20 additional farmers attending on following topics:

- Farm facility hygiene;
- Milking hygiene (udder);
- Milking equipment and tools hygiene;
- Milk storage;
- Mastitis on dairy cows;

Visit to Devoli dairy plant

During our visit to Devoli dairy plant in Pech, we had a meeting with Mr.Driton who is manager of the raw milk sector. We informed him on planned activities of the project and the main goal that is upgrading the knowledge and improving the skills of the farmers on farm management for producing quality milk. We agreed to determine one model farm on their choice where we can have training and workshop for 10- 20 farmers.
The representative form Devoli dairy plant gave us the following data:
The dairy processes UHT milk; they have around 300 cooperants; daily quantity of the collected milk is around 30.000 litres; the payment system is according to the microbiological quality since they have their own laboratory capable for this type of tests; they permanently have problems with milk quality from most of the of farmers; most of the farmers are not enough educated for production of quality raw milk that affects the price they are paid off per litre.

Wednesday 06/07/2005

Places of activities: v. Lepine and Pristine
Cooperants assisting through the daily activities: Lorence Grand Clement, Maksimovich Gradimir-farmer and responsible for intake of milk at the collecting centre at v. Lepine, Skifter Ajvazi-manager of Rona dairy plant.

Visit to the milk collecting centre in village Lepine (Lipljan).

In village Lepine we took data for production process and problems they face at the collecting centre. Mr. Gradimir Maksimivich who is responsible for intake of milk at the collecting centre gave us the following data: the collecting centre daily delivers around 500 litres of milk to Rona dairy plant; the milk is collected from 20 farmers; the price of the milk is determined by the percentage of milk fat and added water in the collected milk. Only alcohol test with 75 % alcohol is performed at the intake of the milk for determining the freshness of the milk. Separate test of each farmers are performed incidentally and irregularly. Because of the added water in the collected milk that is around 10%, the dairy plant, according to the contract with the collecting centre, deducts 25% from the price of the milk. There are no separate test results for the milk quality per farmer and often there is a conflict between farmers or farmers and dairy plant. Mr. Maksimovish was trained for proper taking of the samples from raw milk for chemical analysis and proper handling with Lacto scan for determination of the chemical parameters of the milk. Lactoscan was supplied by Lorence.

Meeting with the manager of Rona dairy plant.

We inform the manager of the planned activities of the project and that the main goal is improving the knowledge and skills of the farmers for farm management in order to produce quality milk. We agreed that five models of farms on their choice should be selected where the training and workshops will be held and 10-20 farmers will attend them. Mr. Skifter gave us the following data for their process: the dairy plant produces white cheese and yellow cheese-kashkaval; they collect around 10.000 litres daily from 150 farmers and they do not have payment system according to microbiological quality. Due to the problems with the quality of raw milk, they showed interest in establishing a system for payment according to the microbiological quality. Considering they do not have their own laboratory for

microbiological testing, the analysis of the raw milk will be performed at the Veterinary Institute in Pristine. They also showed interest in training for proper sampling of the raw milk and adequate transportation of the samples to the laboratory. Additional help for determining the criteria for evaluation of the microbiological quality as well as implementation of the payment system according to this was also asked by them.

Thursday 07/07/2005

Places of activities: Prizren and v. Mamusha
Cooperants assisting through the daily activities: Bunjamin Alili-local consultant of Biolab, Alajdin Tusha-manager of the Abi dairy plant, Arif Mazreku, responsible for the collecting centre at village Mamusha and Nazem Tachi-farmer.

Meeting with the manager of Abi dairy plant, Prizren
We inform the manager of the planned activities of the project and we agreed that one model farm should be selected on their choice where training and workshop for 10-20 farmers will be held.
Mr. Alajdin Tusha gave us the following information about their production process: they process white cheese and yellow cheese- kashkaval, pasteurized milk and acid dairy - fermented products.
They collect the milk from 250 farmers and 15.000 litres of milk are collected daily. They do not have payment system according to microbiological quality. Very often they have problems with the quality of their products due to bad quality of the raw milk. They are interested to establish new payment system according to the microbiological quality in order to stimulate the production of quality milk on the farm, which will result the production of more quality dairy products.
In addition to this they also plan to export in EU countries and they are in the middle of the process of getting the EU export license for which they also need to improve raw milk quality and quality of their products. They also showed interest for training the employees on proper sampling for microbiological analysis and help in implementation of the payment system according to the microbiological quality.

Visit to the farms and milk collection center in village Mamusha (Prizren)

Upon recommendation from Mr. Alajdin Tusha, the manager of Abi dairy plant, we visited the village Mamusha where the dairy plant has collecting centre. The responsible for intake of raw milk was Mr. Arif Mazreku whit whom we appointed training on hygiene at the collecting centre, proper sampling for chemical and microbiological analysis and quick tests for determination of the milk quality. The farm of Mr. Nazem Tashi was selected as a model farm in this village. He has 9 dairy cows form Simmental breed. Mr. Nazem Tashi was informed about the goal of the project.

Friday 08/07/2005

Places of activities: Ferizaj, v. Crnil, v. Babush, v. Loshkobare

Cooperants assisting through the daily activities: Skifter Ajvazi-manager of Rona dairy plant, Bunjamin Alili-local consultant of Biolab, Skender Isufi-farmer, Shefki Zinipotoku-farmer, Memeti Remzi-farmer.

Visit to Rona dairy plant in Ferizaj

On recommendation of Mr. Skifter, five model farms were selected that have substantial production capacities and basic conditions for production of quality milk but due to several

objective and subjective reasons show bad production results. Farms are located in different areas in Kosovo (villages Crnil, Babush, Loshkobare, Konjsko and Donji Godanc).
During the day we visited the farms that were selected as model farm:

1. Farm in village Crnil, owned by Mr. Shefki Zinipotoku. The farm has 12 dairy cows with mixed breeds (Simmental, Montafon) and machine milking system.
2. Farm in village Babush, owned by Mr. Memeti Remzi. The farm has 25 dairy cows with mixed breeds (Simmental, Holstein) and machine milking system.
3. Farm in village Loshkobare and Mr. Skender Isufi as owner. The farm has 53 dairy cows, machine milking system and lacto freezer for cooling the milk. The breeds on this farm are also mixed (Simmental, Montafon, and Holstein).

The farmers were informed about planned activities of the project and they accepted the offer to serve as a model farm for training and workshops for 10-20 farmers.

Monday 11/07/2005

Places of activities: v. Lepine, Pristine

Cooperants assisting through the daily activities: Lorence Grand Clement-KCBS consaltant,

In KCBS office we held a meeting on which we prepare a plan for the dynamics and schedule for conducting the training and workshops at the model farms. We also made a list of equipment and chemical preparations necessary for farm training that has to be purchased for 7 model farms.

Tuesday 12/07/2005

Places of activities: v. Rubovce and v. Konjsko

Cooperants assisting through the daily activities: Lorence Grand Clement-KCBS consaltant, Bunjamin Alili-local consultant of Biolab, Kemail Rechica-responsible for intake of the milk at the collecting centre in village Rubovce, Labinat Murati-farmer.

Training at the collecting centre in village Rubovce

The collecting centre in village Rubovce cooperates with Rona dairy plant and daily collects around 1000 l. from 30 farmers.
The premise satisfies the basic hygiene criteria for collecting of raw milk: floor is covered with ceramic plates, cold and hot water is provided, drainage for waste water and basic equipment for maintaining the hygiene at the premises. Milk is stored in lacto freezer and it is kept on proper temperature until dispatch. For determination of the milk quality only the alcoholic test with 75 % alcohol is applied. The cleaning of the premises, equipment for intake of milk and utensils is done by using ordinary detergents for home cleaning and disinfection of the premises and equipment with proper chemicals is not applied.
Training is performed for 3 persons that permanently or occasionally work at the collecting centre. The goal was to increase the hygienic level at the collecting centre, to maintain the quality of the milk until it is delivered to the dairy plant. The following topics were covered by the training: choose of the cleaning chemicals for enterer of the premises, equipment and utensils, choose of cleaning equipment for enterer and milk equipment, procedure for cleaning the milk equipment, disinfection of the enterer, equipment and utensils, proper sampling for microbiological and chemical analysis of the milk, application of the blue methylene tests and training for handling Lacto scan and pH meter.

Workshop at v. Konjsko-farm Labinat Murati

At the farm in this village, property of Mr. Labinat Murati we held workshop on which 20 dairy producers attended. The topic of the workshop was "Good Hygiene Practice" at the farm

with the following sub topics: hygiene at the stables (cleaning, disinfection and ventilation); hygiene of the milkers, hygiene of the milking (preparation of the udder, control of the vacuum and pulsations in the milking system, control of the rubber parts of the milking machine); cooling of the milk; hygiene of the milking equipment and storage of the milk (choose of cleaning chemicals and disinfectants for cleaning the milk equipment, choose of cleaning equipment, procedure for cleaning of the milking equipment and other equipment and utensils); Testing dairy cows for sub clinical mastitis and proper therapy treatment of the sick cows.
It was practically demonstrated all procedures that will allow farmers production of the quality milk and health protection for the dairy cows. Farmers were interested and asked varieties of questions: about the time and way of drying the dairy cows, time and way of weaning the calves, for feeding regime and influence of feeding on chemical content of the milk and for payment system according to the microbiological quality. After the workshop the farmers were given printed educational material.

Wednesday 13/07/2005

Places of activities: v. Crnil and v. Babush

Cooperants assisting through the daily activities: Bunjamin Alili-local consultant of Biolab, Shefki Zinipotoku-farmer and Memeti Remzi-farmer.

Training at the model farm at village Crnil
The farm owned by Shefki Zinipotoku has 12 dairy cows with mixed breeds (Simmental and Montafon).It processes around 140 litres of milk obtained from 11 cows in lactation (13 litre per cow).
The training was held for Mr. Shefki and his two suns who are included in the farm business. There was practical demonstration of all procedures for production of high quality milk: washing and disinfection of the udder before milking, drying the udder with paper towels, milking the first milk spouts in special vessel and visual control of the milked milk, proper set up of the milking units, control of the vacuum and number of pulsations in the milking units, disinfection of the udder after milking, cleaning and disinfection of the milking equipment and control of the integrity of the rubber parts of the milking machine.
They were also trained for proper application of California Mastitis Test (CMT), proper evaluation of the test results and for local treatment with antibiotics of the cows with sub clinical mastitis.
Specific recommendation for irregularities in the farm business:

- Bad ventilation in the enterer with higher level of moisture and ammonia

Reason: Inadequate construction, bad system for waste disposal and poor hygiene
Recommendation: Opening ventilation hols at the roof, improving the system for waste disposal and improving the hygiene in the premises.

- Moist floor

Reason: There is a rubber band set at the beds that withhold urine and water; insufficient quantity of straw litter
Recommendation: Removing of the rubber band, regular removal of the dirty and moist litter and putting enough quantities of dry litter

- Subclinical mastitis at 9 out of 11 dairy cows

Reason: Bad hygienic conditions at the premises, bad hygiene of the udder and inadequate hygiene of the milking equipment, irregular changing of the rubber parts from the milking machine

Recommendation: Improving the hygiene at the enterer, disinfection of the udder before and after milking, improving the hygiene of the milking equipment (proper choose of utensils and cleaning chemicals, control of the nipple rubbers and their regular changing, regular test on mastitis and on time treatment of the sick cows.

- Low milk production per cow

Reason: Sub clinical mastitis and inadequate feeding of the dairy cows (feeding only with hay and low protein feed)
Recommendation: Treatment of the sick cows and proper feeding regime for dairy cows according to the lactation period (quality hay and concentrate)

After the training the farmers were given training material, (cleaning chemicals and disinfectants for cleaning of the equipment, cleaning chemicals for disinfection of the udder, equipment for cleaning the milking equipment, (glasses for disinfection of the udder and milking the first milk spouts, mastitis test kit) and printed educational material.

Training at the model farm at village Crnil

Farm in property of Mr. Memeti Ramiz has 21 dairy cows with mixed breeds (Holstein and Simmental). Mr. Memeti and 4 members of his family that are working at the farm were present at the training. There was a practical demonstration of all procedures for production of high quality milk, proper application of California Mastitis Test (CMT), proper evaluation of the test results and local treatment with antibiotics to the cows with sub clinical mastitis.
Specific recommendation for irregularities in the farm business:

- Bad ventilation in the enterer with higher level of moisture and ammonia

Reason: Small numbers of hols with small dimension for ventilation
Recommendation: Setting up additional hols for ventilation and opening of the existing windows.

- Subclinical mastitis at 15 out of 21 dairy cows

Reason: Bad hygienic conditions at the premises, bad hygiene of the udder and inadequate hygiene of the milking equipment, irregular changing of the rubber parts from the milking machine.
Recommendation: Improving the hygiene at the enterer (washing and disinfection of the beds), disinfection of the udder before and after milking, improving the hygiene of the milking equipment (Proper chooses of utensils and cleaning chemicals), control of the nipple rubbers and their regular changing, regular test on mastitis and on time treatment of the sick cows.

- Moist litter in the pens for calves:

Reason: Irregular changing of the litter in the pens is and sedimentation of urine and faeces.
Recommendation: Daily supplementation of dry litter (straw) in the pens for calves and once per day removal of the dirty litter and disinfection of the pens.

- Milking 3 times a day-it was recommended to the farmer to change it to milking twice per day. The quantity of milk that the farmer gets when milking 3 times a day is 5-7% higher than the milking twice a day but the production costs (electricity, water, cleaning chemicals, workers, increased possibility for mastitis) oversize the profit gained from the higher amount of milk when milking 3 times a day.

After the training the farmer was given training material (cleaning chemicals and disinfectants for cleaning of the equipment, cleaning chemicals for disinfection of the udder, equipment for cleaning the milking equipment, (glasses for disinfection of the udder and milking the first milk spouts, mastitis test kit) and printed educational material.

Thursday 14/07/2005

Places of activities: v. Donji Godanc and v. Mamusha

Cooperants assisting through the daily activities: Lorence Grand Clement-KCBS consaltant, Bunjamin Alili-local consultant of Biolab, Idriz Hajdini-farmer and responsible for the collecting centre in Donji Godanc, Nazem Tachi-farmer.

Training in the collecting centre at village Donji Godanc

The collecting centre in village Rubovce cooperates with Rona dairy plant and collects around 500 l. daily from 12 farmers.

The premise satisfies the basic hygiene criteria for collecting of raw milk: floor is covered with ceramic plates, cold and hot water is provided and drainage for waste water. Milk is stored in lacto freezer and it is kept on proper temperature until dispatch. For determination of the milk quality only the alcoholic test with 75 % alcohol is applied. The cleaning of the premises, equipment for intake of milk and utensils is done by using ordinary detergents for home cleaning and without use of proper brushes for cleaning the equipment. Disinfection of the premises and equipment with proper chemicals is not applied.

The training was organized for Mr. Idriz Hajdini who is constantly involved in the work at the collecting centre.

The goal was to increase the hygienic level at the collecting centre, to maintain the quality of the milk until it is delivered to the dairy plant. The following topics were covered by the training: choose of the cleaning chemicals for enterer of the premises, equipment and utensils, choose of cleaning equipment for enterer and milk equipment, procedure for cleaning the milk equipment, disinfection of the enterer, equipment and utensils, proper sampling for microbiological and chemical analysis of the milk, application of the blue methylene tests and training for handling Lacto scan and pH meter.

Workshop at v. Donji Godanc (Shtimlje)-farm Idriz Hajdini

This workshop was held at the farm, property of Mr. Idriz Hajdini and 15 dairy producers were present.

The topic of the workshop was "Good Hygiene Practice" at the farm with the following sub topics: hygiene at the stables (cleaning, disinfection and ventilation); hygiene of the milkers, hygiene of the milking (preparation of the udder, control of the vacuum and pulsations in the milking system, control of the rubber parts of the milking machine); cooling of the milk; hygiene of the milking equipment and storage of the milk (choose of cleaning chemicals and disinfectants for cleaning the milk equipment, choose of cleaning equipment, procedure for cleaning of the milking equipment and other equipment and utensils); Testing dairy cows for sub clinical mastitis and proper therapy treatment of the sick cows.

It was practically demonstrated all procedures that will allow farmers production of the quality milk and health protection for the dairy cows. Farmers were interested and asked questions about: payment system according to the microbiological quality, the reasons for occurring and ways for treatment of the pod dermatitis, reproductive problems, feeding regime and effects of improper feeding.

After the workshop the farmers were given printed educational material.

Training at the model farm at village Mamusha (Prizren)

Farm in property of Mr. Nazem Tachi has 9 dairy cows from Holstein and Simmental breeds. Mr. Tachi and 5 members of his family that are working at the farm were present at the training. There was a practical demonstration of all procedures for production of high quality milk, proper application of California Mastitis Test (CMT), proper evaluation of the test results and local treatment with antibiotics to the cows with sub clinical mastitis.

Specific recommendation for irregularities in the farm business:

- Bad ventilation in the enterer with higher level of moisture and ammonia

Reason: No hols for ventilation. The only possible ventilation is trough two entrance doors that are positioned on the sides of the premises.
Recommendation: Setting up additional hols for ventilation.

- Subclinical mastitis at 5 out of 9 dairy cows

Reason: Higher vacuum and over numbered pulsations in the milking machine; bad hygienic conditions at the premises, bad hygiene of the udder and inadequate hygiene of the milking equipment, irregular changing of the rubber parts from the milking machine.
Recommendation: Regular control and adjustment to the vacuum and number of pulsations of the milking machine, improving the hygiene at the enterer (washing and disinfection of the beds), disinfection of the udder before and after milking, improving the hygiene of the milking equipment (Proper chooses of utensils and cleaning chemicals), control of the nipple rubbers and their regular changing, regular test on mastitis and on time treatment of the sick cows.

- Moist litter in the pens for calves

Reason: Irregular changing of the litter in the pens is and sedimentation of urine and faeces.
Recommendation: Daily supplementation of dry litter (straw) in the pens for calves and once per day removal of the dirty litter and disinfection of the pens.

After the training the farmer was given training material (cleaning chemicals and disinfectants for cleaning of the equipment, cleaning chemicals for disinfection of the udder, equipment for cleaning the milking equipment,(glasses for disinfection of the udder and milking the first milk spouts, mastitis test kit)and printed educational material.

Friday 15/07/2005

Places of activities: v. Loshkobare

Cooperants assisting through the daily activities: Bunjamin Alili-local consultant of Biolab, Abdula Isufi-farmer.

Training at the model farm-Abdula Isufi
Farm in property of Mr. Abdula Isufi has 50 dairy cows from Montafon breed. The premise is new with good construction that is suitable for dairy cows farm breed inside of the farm. The dairy plant is equipped with machine milking system and lacto freezer for cooling the milk. The basic conditions for production of high quality raw milk exist. Raw milk from this farm is delivered to Rona dairy plant.
Mr. Abdula and 2 employees attended the training. There was a practical demonstration of all procedures for production of high quality milk, proper application of California Mastitis Test (CMT), proper evaluation of the test results and local treatment with antibiotics to the cows with sub clinical mastitis.
Specific recommendation for irregularities in the farm business:

- Insufficient ventilation in the enterer with higher level of moisture and ammonia

Reason: The hols for natural ventilation which are properly positioned are not enough because of the size of the premise and number of cows.
Recommendation: Setting up additional hols for ventilation in the roof or setting ventilators with adequate capacity on the sides of the premises.

- Subclinical mastitis at 20 out of 50 dairy cows

Reason: No washing and disinfection of the beds; bad hygiene of the udder and inadequate hygiene of the milking equipment, irregular changing of the rubber parts from the milking machine.

Recommendation: Improving the hygiene at the enterer (washing and disinfection of the beds), disinfection of the udder before and after milking, improving the hygiene of the milking equipment
(Proper chooses of utensils and cleaning chemicals, control of the nipple rubbers and their regular changing, regular test on mastitis and on time treatment of the sick cows.

- Pod dermatitis

Reason: Irregular cutting of the toes (ungulate) that leads to overgrowing of the cornea, crackling and infection.
Recommendation: Control of toes and on time cutting, disinfection of the beds.

- Arthritis at the back legs

Reason: Due to insufficient quantity of the straw litter, the cows are hurt in contact with the concrete base when laying down or standing up.
Recommendation: Providing sufficient quantity of straw litter as shock absorber for the hits of the joints during lying down or standing up.

After the training the farmer was given training material (cleaning chemicals and disinfectants for cleaning of the equipment, cleaning chemicals for disinfection of the udder, equipment for cleaning the milking equipment, (glasses for disinfection of the udder and milking the first milk spouts, mastitis test kit) and printed educational material.

Monday 18/07/2005

Places of activities: area around Stimlje

Cooperants assisting through the daily activities: Nazmi Zekiri-local consultant of Biolab, Bajram Mujota-farmer

Training at the model farm-Bajram Mujota
Farm in property of Mr. Bajram Mujota has 52 dairy cows. The premise is new with potential good conditions for production of high quality milk. The milking is done with machine milking system and cooling with lacto freezer.
The basic conditions for production of high quality raw milk exist. Collection of the milk from this farm is done by Devoli dairy plant in Pech. The payment is done according to the microbiologic quality. In the former period, according to the classification of the milk at Devli dairy plant, this farm produces milk with 100.000-300.000 micro organisms in ml milk, for which gets preemie of +5%. The purpose of this is improving the quality of the raw milk and if the number of microorganisms in ml milk is under 100.000 the preemie will be 10 % from the price of the milk.
Mr. Bajram and 7 members of his family that are working at the farm attended the training. There was a practical demonstration of all procedures for production of high quality milk, proper application of California Mastitis Test (CMT), proper evaluation of the test results and local treatment with antibiotics to the cows with sub clinical mastitis. The training also covered the following topics asked by the farmer: early weaning of the calves and feeding with milk supplements; importance of the colostrum in the feeding of the calves; feeding of the cows according to lactation phase; influence of feeding to the chemical content of the milk; diseases connected with improper feeding and reasons for infertility of the cows.
Specific recommendation for irregularities in the farm business:

- Insufficient ventilation in the enterer with higher level of moisture and ammonia

Reason: The holes for natural ventilation are not enough because of the size of the premise and number of cows.
Recommendation: Setting up additional holes for ventilation in the roof or setting electrical ventilators with adequate capacity on the sides of the premises.

- Sub clinical mastitis at 15 out of 52 dairy cows

Reason: No washing and disinfection of the beds; bad hygiene of the udder and inadequate hygiene of the milking equipment, irregular changing of the rubber parts from the milking machine.
Recommendation: Improving the hygiene at the enterer (washing and disinfection of the beds), disinfection of the udder before and after milking, improving the hygiene of the milking equipment (Proper chooses of utensils and cleaning chemicals, control of the nipple rubbers and their regular changing, regular test on mastitis and on time treatment of the sick cows.

- Overgrowth cornea at most of the cows

Reason: Irregular cutting of the toes (ungulate) that leads to overgrowing of the cornea, crackling and infection.
Recommendation: Control of toes and on time cutting, disinfection of the beds.

After the training the farmer was given training material (cleaning chemicals and disinfectants for cleaning of the equipment, cleaning chemicals for disinfection of the udder, equipment for cleaning the milking equipment, (glasses for disinfection of the udder and milking the first milk spouts, mastitis test kit) and printed educational material.

Tuesday 19/07/2005

Places of activities: v. Konjsko
Cooperants assisting through the daily activities: Zijadin Gonjovci, Lorence Grand Clement-KCBS consultant, Labinat Murati-farmer
Training at the model farm-Labinat Murati
Farm in property of Mr. Labinat Murati has 10 dairy cows. The premise is with insufficient ventilation and with improperly constructed beds and without waste disposal channel. Since the urine and faeces is permanently sediment, the beds are constantly moister. The milking is done with machine milking. The milk is delivered to the collecting centre in village Rubovce.
Mr. Labinat and his father attended the training.
There was a practical demonstration of all procedures for production of high quality milk, proper application of California Mastitis Test (CMT), proper evaluation of the mastitis test results and local treatment with antibiotics to the cows with sub clinical mastitis.
Several additional topics were also covered at the training on request of the farmer: estrus (records and informing the vet service); diseases at new delivered calves (diarrhea and pneumonia); feeding according to lactation phase; parasite diseases (symptoms and treatment); early weaning of the calves and feeding with milk supplements; influence of feeding on chemical content of the milk.
Specific recommendation for irregularities in the farm business:

- Insufficient ventilation in the enterer with higher level of moisture and ammonia

Reason: The premise is considerably closed with not enough holes for ventilation and the waste disposal is difficult due to lack of channel for that purpose.
Recommendation: expending the holes for ventilation and construct the channel for waste disposal, regular disposal of the waste and occasional washing and disinfection of the beds.

- Sub clinical mastitis at 8 out of 10 dairy cows

Reason: Permanently moist and dirty beds, bad hygiene of the udder and inadequate hygiene of the milking equipment, irregular changing of the rubber parts from the milking machine.
Recommendation: Improving the hygiene at the enterer (washing and disinfection of the beds), supplying bigger quantity of the straw litter at the beds, disinfection of the udder before and after milking, improving the hygiene of the milking equipment (proper chooses of

utensils and cleaning chemicals), control of the nipple rubbers and their regular changing, regular test on mastitis and on time treatment of the sick cows.

- Overgrowth cornea at most of the cows.

Reason: Irregular cutting of the toes (ungulate) that leads to overgrowing of the cornea, crackling and infection.
Recommendation: Control of toes and on time cutting, disinfection of the beds.

After the training the farmer was given training material (cleaning chemicals and disinfectants for cleaning of the equipment, cleaning chemicals for disinfection of the udder, equipment for cleaning the milking equipment, (glasses for disinfection of the udder and milking the first milk spouts, mastitis test kit) and printed educational material.

Wednesday 20/07/2005

Places of activities: v. Crnil (Ferizaj)
Cooperants assisting through the daily activities: Zijadin Gonjovci, Bunjamin Alili-local consultant of Biolab, Shefki Zinipotoku -farmer

Workshop at v. Crnil-farm Shefki Zinipotoku
This workshop was held at the farm, property of Mr. Shefki Zinipotoku and 3 dairy producers were present.
The topic of the workshop was "Good Hygiene Practice" at the farm with the following sub topics: hygiene at the stables (cleaning, disinfection and ventilation); hygiene of the milkers, hygiene of the milking (preparation of the udder, control of the vacuum and pulsations in the milking system, control of the rubber parts of the milking machine); cooling of the milk; hygiene of the milking equipment and storage of the milk (choose of cleaning chemicals and disinfectants for cleaning the milk equipment, choose of cleaning equipment, procedure for cleaning of the milking equipment and other equipment and utensils); Testing dairy cows for sub clinical mastitis and proper therapy treatment of the sick cows.
It was practically demonstrated all procedures that will allow farmers production of the quality milk and health protection for the dairy cows. Farmers were interested and asked questions about: payment system according to the microbiological quality, the reasons for occurring and ways for treatment of the pod dermatitis, reproductive problems, feeding regime and effects of improper feeding.
After the workshop the farmers were given printed educational material.

Thursday 21/07/2005

Places of activities: v. Donji Godanc (Shtimlje)
Cooperants assisting through the daily activities: Bunjamin Alili-local consultant of Biolab, Idriz Hajdini-farmer

Training at the model farm-Idriz Hajdini
Farm in property of Mr. Idriz Hajdini has 30 dairy cows. The premise is old, with insufficient ventilation and with improperly constructed beds and without waste disposal channel. Since the urine and faeces is permanently sediment, the beds are constantly moister. General hygiene condition on the premise is bad and as a result, most of the cows have bad health condition. The milking is done with machine milking. The milk is delivered to the collecting centre in village Donji Godanc.
Mr. Idriz and 3 members of his family that are working at the farm attended the training.
There was a practical demonstration of all procedures for production of high quality milk, proper application of California Mastitis Test (CMT), proper evaluation of the mastitis test results and local treatment with antibiotics to the cows with sub clinical mastitis.

Several additional topics were also covered at the training on request of the farmer: pod dermatitis (reason, prevention and treatment); puerperal paresis after delivery of calf (reason, prevention and treatment); feeding of the cows according to lactation phase; arthritis; early weaning of the calves and feeding with milk supplements; influence of feeding on chemical content of the milk.
Specific recommendation for irregularities in the farm business:

- Insufficient ventilation in the enterer with higher level of moisture and ammonia

Reason: The premise is considerably closed with not enough holes for ventilation and the waste disposal is difficult due to lack of channel for that purpose.
Recommendation: expending the holes for ventilation and construct the channel for waste disposal, regular disposal of the waste and occasional washing and disinfection of the beds.

- Subclinical mastitis at 20 out of 30 dairy cows

Reason: Permanently moist and dirty beds, bad hygiene of the udder and inadequate hygiene of the milking equipment, irregular changing of the rubber parts from the milking machine.
Recommendation: Improving the hygiene at the enterer (washing and disinfection of the beds), supplying bigger quantity of the straw litter at the beds, disinfection of the udder before and after milking, improving the hygiene of the milking equipment (proper chooses of utensils and cleaning chemicals), control of the nipple rubbers and their regular changing, regular test on mastitis and on time treatment of the sick cows.

- Pod dermatitis

Reason: Irregular cutting of the toes (ungulate) that leads to overgrowing of the cornea, crackling and infection.
Recommendation: Control of toes and on time cutting, disinfection of the beds.

- Arthritis at the back legs

Reason: Due to insufficient quantity of the straw litter, the cows are hurt in contact with the concrete base when laying down or standing up.
Recommendation: Providing sufficient quantity of straw litter as shock absorber for the hits of the joints during lying down or standing up.

- Paresis and stiffness of the back muscles at 5 cows

Reason: Improper feeding of cows according to lactation phase.
Recommendation: For preventing this, the proper feeding regime according to lactation phases in necessary. It is also necessary to apply vitamin- mineral premixes in the feeding. For most of the sick cows, intervention by vets is necessary.

After the training the farmer was given training material (cleaning chemicals and disinfectants for cleaning of the equipment, cleaning chemicals for disinfection of the udder, equipment for cleaning the milking equipment, (glasses for disinfection of the udder and milking the first milk spouts, mastitis test kit) and printed educational material.

Friday 22/07/2005

Places of activities: v. Mamusha (Prizren)
Cooperants assisting through the daily activities: Ismail Cani-local consultant of Biolab, Arif Mazreku-farmer and responsible for the collecting centre at v. Mamusha.

Training at the collecting centre in village Mamusha
The collecting centre in village Mamusha cooperates with Abi dairy plant in Prizren and collects around 2000 litres per day.

The premise satisfies the basic hygiene criteria for collecting of raw milk: floor is covered with ceramic plates, cold and hot water is provided and drainage for waste water. Milk is stored in lacto freezer and it is kept on proper temperature until dispatch. For determination of the milk quality, the titrate method with NaOH and phenolphthalein and Gerber's method for determination of the % of milk fat are applied. The cleaning of the premises, equipment for intake of milk and utensils is done by using ordinary detergents for home cleaning and without use of proper brushes for cleaning the equipment. Disinfection of the premises and equipment with proper chemicals is not applied.
The training was organized for Mr.Arif Mazreku who is constantly involved in the work at the collecting centre.
The goal was to increase the hygienic level at the collecting centre, to maintain the quality of the milk until it is delivered to the dairy plant. The following topics were covered by the training: choose of the cleaning chemicals for enterer of the premises, equipment and utensils, choose of cleaning equipment for enterer and milk equipment, procedure for cleaning the milk equipment, disinfection of the enterer, equipment and utensils, proper sampling for microbiological and chemical analysis of the milk, application of the blue methylene tests and training for handling Lacto scan and pH meter.

Workshop at v. Mamusha-farm Arif Mazreku
This workshop was held at the farm, property of Mr. Arif Mazreku and 10 dairy producers were present.
The topic of the workshop was "Good Hygiene Practice" at the farm with the following sub topics: hygiene at the stables (cleaning, disinfection and ventilation); hygiene of the milkers, hygiene of the milking (preparation of the udder, control of the vacuum and pulsations in the milking system, control of the rubber parts of the milking machine); cooling of the milk; hygiene of the milking equipment and storage of the milk (choose of cleaning chemicals and disinfectants for cleaning the milk equipment, choose of cleaning equipment, procedure for cleaning of the milking equipment and other equipment and utensils); testing dairy cows for subclinical mastitis and proper therapy treatment of the sick cows.
It was practically demonstrated all procedures that will allow farmers production of the quality milk and health protection for the dairy cows. Farmers were interested and asked questions about: payment system according to the microbiological quality, reproductive problems, feeding regime and effects of improper feeding.
After the workshop the farmers were given printed educational material.

Tuesday 02/08/2005

Places of activities: KCBS office, Pristine
Cooperants assisting through the daily activities: Zijadi Gonjovci, Bunjamin Alili-local consultant of Biolab, Skifter Ajvazi-menager of Rona dairy plant.

A meeting was held at which all finished activities were discussed and schedule for the future activities was agreed as well as schedule for preparation of educational material.

Monday 08/08/05-Wednesday 10/08/05

Cooperants assisting through the daily activities: Bunjamin Alili, Fadil Sinani-farmer, Muarem Seidiu-farmer and Ejup Chosa-farmer
Places of activities: villages Shajkovac (Poduevo), Kolich (Pristine) and Slatina (Vitina)

Workshops at villages Shajkovac (Poduevo)-farm Fadil Sinani, Kolich (Pristine)-farm Muarem Seidiu and Slatina (Vitina)-farm Ejup Chosa
31 Dairy producers attended at the 3 workshops. The topic of the workshops was "Good Hygiene Practice" at the farm with the following sub topics: hygiene at the stables (cleaning, disinfection and ventilation); hygiene of the milkers, hygiene of the milking (preparation of the

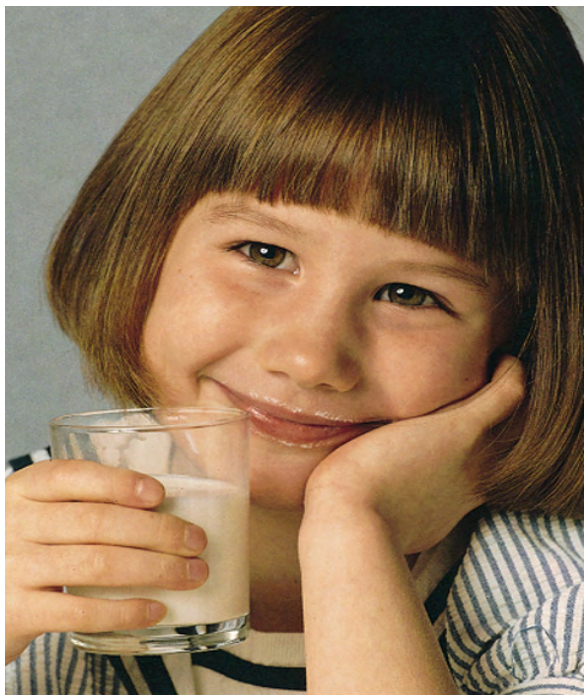
udder, control of the vacuum and pulsations in the milking system, control of the rubber parts of the milking machine); cooling of the milk; hygiene of the milking equipment and storage of the milk (choose of cleaning chemicals and disinfectants for cleaning the milk equipment, choose of cleaning equipment, procedure for cleaning of the milking equipment and other equipment and utensils); Testing dairy cows for sub clinical mastitis and proper therapy treatment of the sick cows.
It was practically demonstrated all procedures that will allow farmers production of the quality milk and health protection for the dairy cows. Farmers were interested and asked varieties of questions: payment system according to microbiological quality; reasons and treatment for pod dermatitis; reproductive problems; feeding regime of dairy cows and effects from improper feeding.
After the workshop the farmers were given printed educational material.

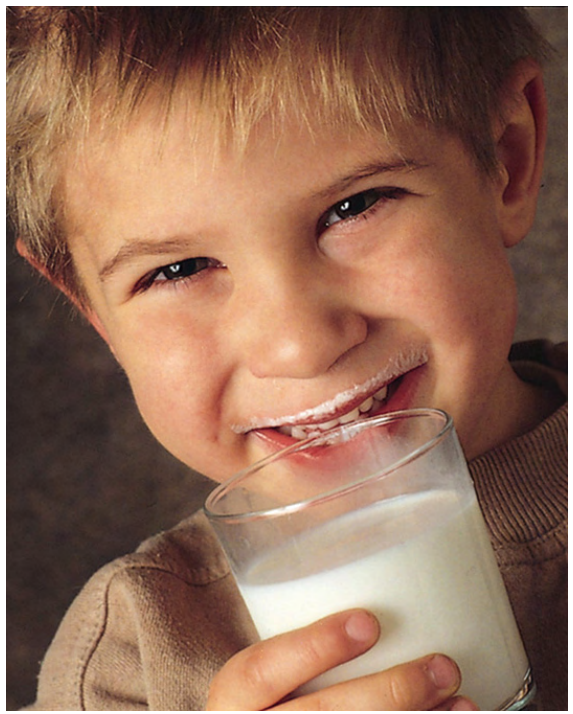
PRODUCTION OF QUALITY RAW MILK

MILK QUALITY

MILK QUALITY

The consumers want quality milk!

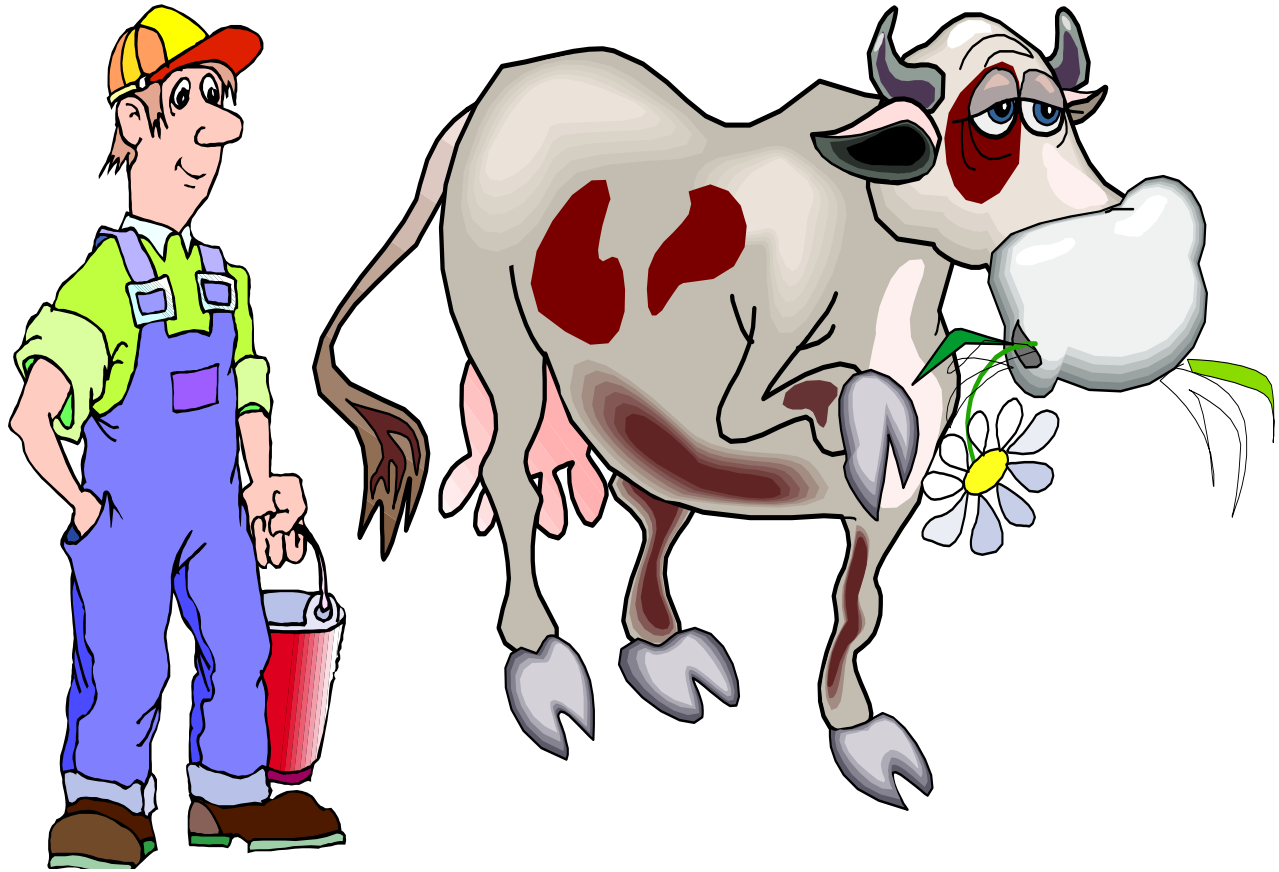




MILK QALITY

The dairy plant want quality raw milk!

How to produce high quality raw milk with high price ?



The criteria's which define the raw milk quality!

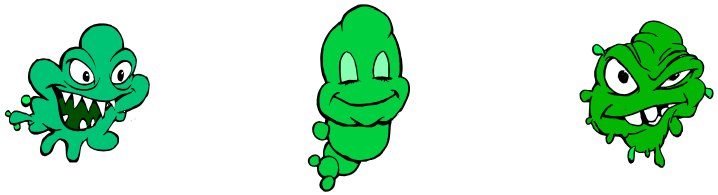
The basic and main factors which define raw milk quality are:

- **Total bacteria number,**
- **Number of somatic cells,**
- **Chemical composition- proteins, milk fat and lactose.**

RAW MILK QUALITY

First critera: Bacteria total number account

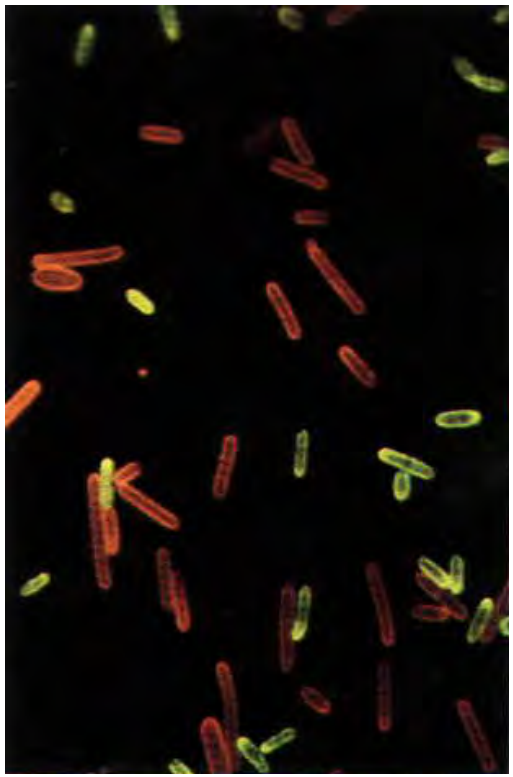
Raw milk quality: Bacteria number



How bacteria comes in the raw milk?

The external environment is main source of milk contamination with bacteria:

- dust and filth,
- milking equipment,
- milking accessories and etc.

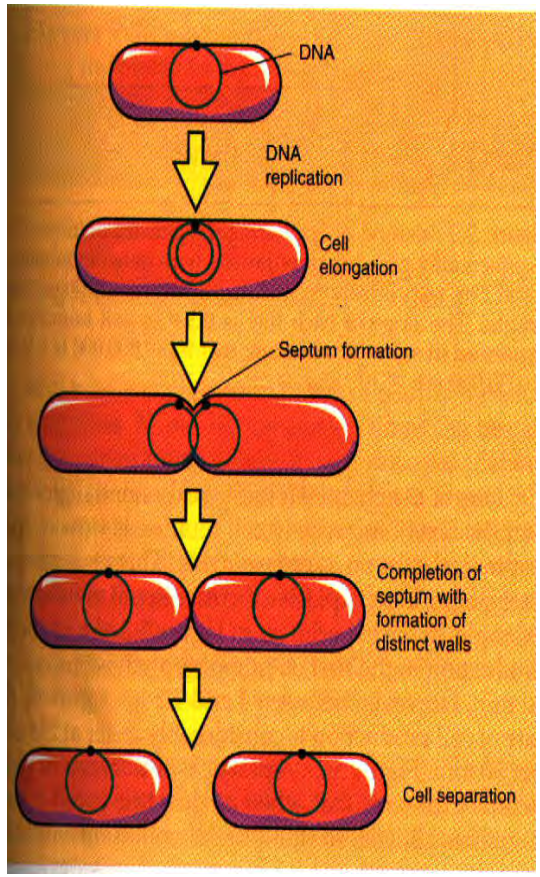


Raw milk quality: Bacteria number

The second main reason for increasing bacteria number in the raw milk is its reproduction.

At temperature of 25ºC, on each 20 minutes, the bacteria number in raw milk is doubled.

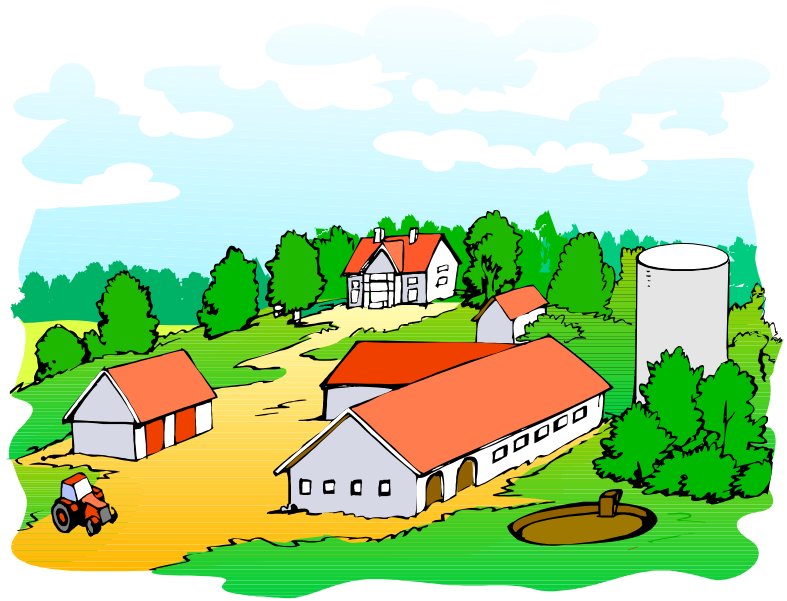
It means that, if in the raw milk are 100.000 bacteria, for 20 minutes their number will be 200.000, next 20 minutes, 400.000, then 800.000, 1600.000 etc.



Raw milk quality: Bacteria number

The bacteria total number account into the raw milk directly depends from:

- hygiene condition of the dairy farm,
- health condition of the dairy cows during the lactation period.



Raw milk quality: Bacteria number

The milk from udder of healthy animal is clean and healthy. If the milk is contaminated (during or after milking), there is no other milk processing solutions, that will enable the prior condition of quality and pureness. There for, there is a need of production of pure milk and maintaining its pureness until selling or processing.

Raw milk quality: Bacteria number

- **How may the farmers reduce total bacteria number in the raw milk?**

1. With preserving good farm hygiene condition!

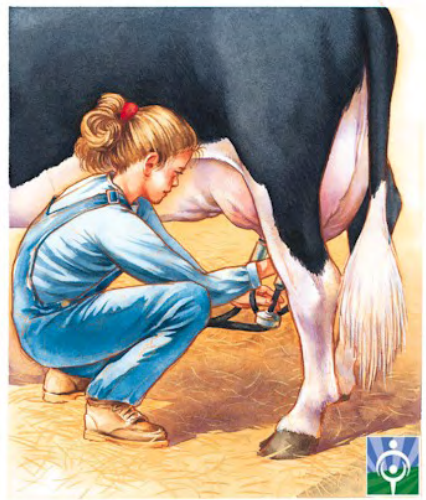
Raw milk quality: Bacteria number

Farm hygiene

- The farm walls should be whiten at least once a year.
- Regular changes of the floor litter of straw or hay.
- The cow feeding, the litter changing or farm cleaning should be made 1-2 hours before milking or between two milking.
- Occasional disinfection of the farm floor with disinfectants or 2% solution of NaOH (Sodium hydroxide).

Raw milk quality: Bacteria number

- **How the farmers may reduce total bacteria number in the raw milk?**



2. With good hygiene of the milker!

Raw milk quality: Bacteria number

Hygiene of the milker

- The main rules are: clean clothes, clean hands and nails.
- The milker before milking must carefully wash his hands with soap.
- The hands never should be put into the milk during the milking process.

Raw milk quality: Bacteria number

- **How the farmers may reduce total bacteria number in the raw milk?**

3. With good udder hygiene and milking hygiene!

Raw milk quality: Bacteria number

Hygiene of the udder and hygiene during the milking process

- Wash up the udder with tap water and disinfectants before milking,
- Wipe the udder, especially tits with cotton or paper clout,
- From each tit, milking the first freshets into the separate pail with black background,
- Properly pose the milking equipment,
- After milking, disinfect the tits with iodine preparation.

Raw milk quality: Bacteria number

Hygiene of the udder and hygiene during the milking process

- It is not correct milking on a floor or on a mat of the barn, no mater weather is a case of healthy, affected or treated cows;
- The cows with mastitis and treated cows (with antibiotics or other medicine) are milked last into separate pail;
- Complete milking of the udder, because milk residue may cause mastitis.

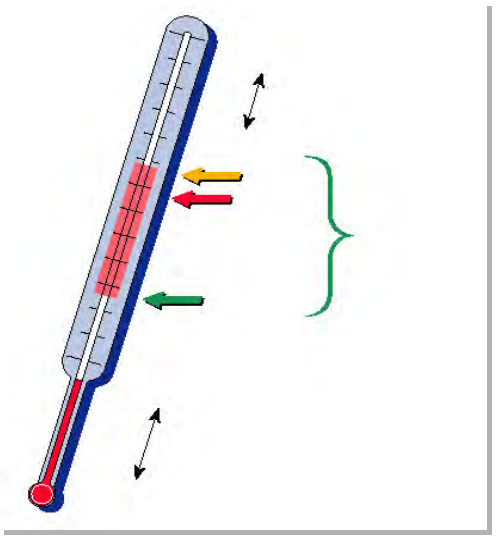
Raw milk quality: Bacteria number

Hygiene of the udder and hygiene during the milking process

- Immediately after milking, the tank with milk has to be removed from the barn into separate tract for milk storage,
- Before putting the raw milk into the collecting tank, it should be strained through the clean laminate cloth,
- In order to prevent from contamination with dust, insects and etc use clean covers for storage tanks.

Raw milk quality: Bacteria number

- **How the farmers may reduce total bacteria number in the raw milk?**

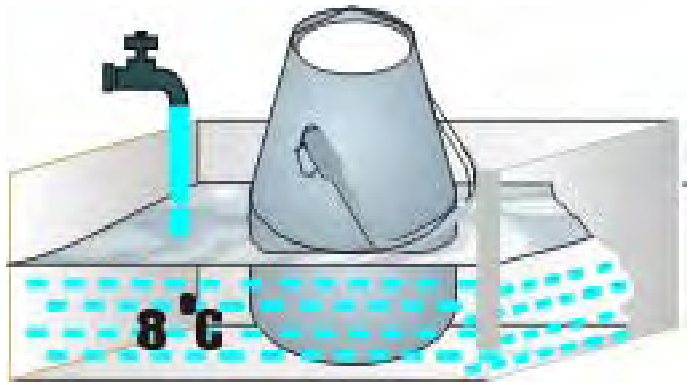


4. With fast and efficient cooling of the raw milk!

Raw milk quality: Bacteria number

Raw milk cooling

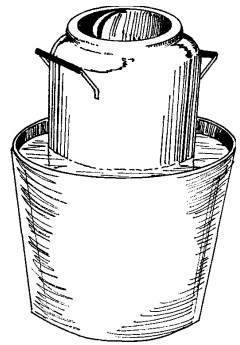
If the time from milking to selling is more then 2 hours, the milk must be cooled on 0-8 °C. This temperature must be kept until selling or processing of the milk.



Raw milk quality: Bacteria number

Way of milk cooling

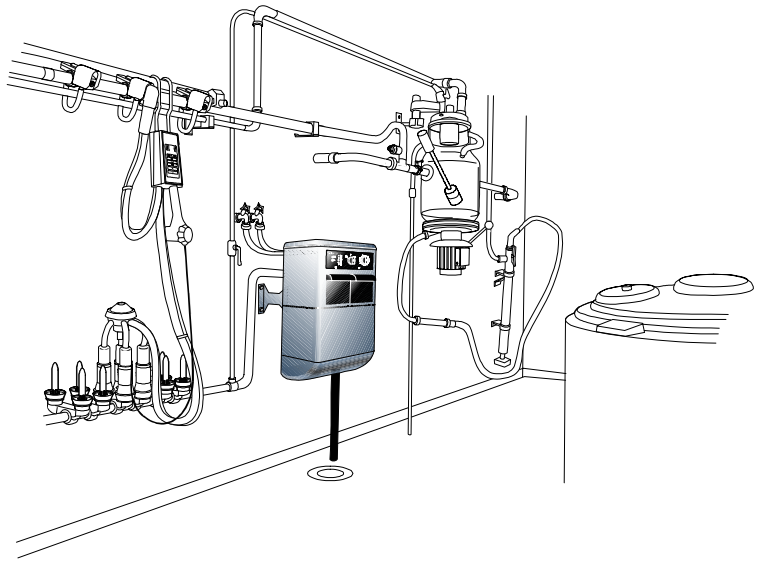
- The best and most sanitary way of milk cooling is usage of **lacto refrigerator.**
- Put the milk tanks into the broadly tanks with cool water or with ice.



- Put the milk tanks under freshet of cool water, about 1 hour, and after that into the refrigerator to keep temperature until selling.
- Wrong way is to put bottle with ice into the milk tanks!

Raw milk quality: Bacteria number

- **How the farmers may reduce total bacteria number in the raw milk?**

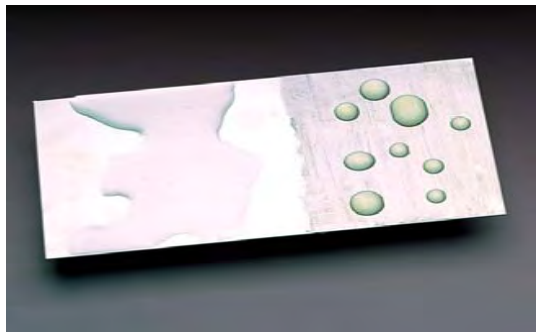


5. **With establishing of good and regural cleaning procedure for milk equipment!**

Raw milk quality: Bacteria number

CLEANING OF MILKING EQUIPMENT

During the usage, layers of milk fat, proteins, milk stone, minerals and bacteria are deposit on the surface of the milking equipment.



Raw milk quality: Bacteria number

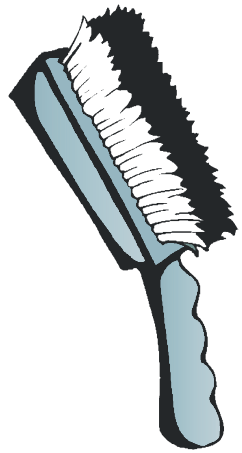
CLEANING OF MILKING EQUIPMENT

- The main goals of the milking equipment cleaning are elimination of this type of residua, which are good media for bacteria, and elimination of the existing bacteria.

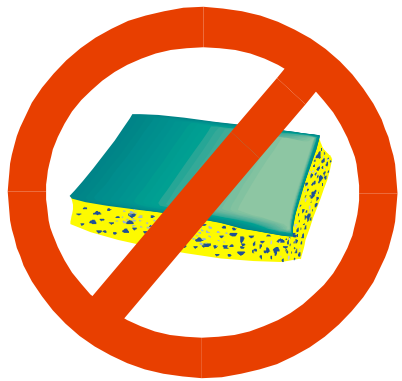
Raw milk quality: Bacteria number

Cleaning equipment

For cleaning of milk equipment, always use **brush–**because it can be cleaned easer and it doesn't retain milk residue.



Is not correct to use sponge for milk equipment cleaning!



Raw milk quality: Bacteria number

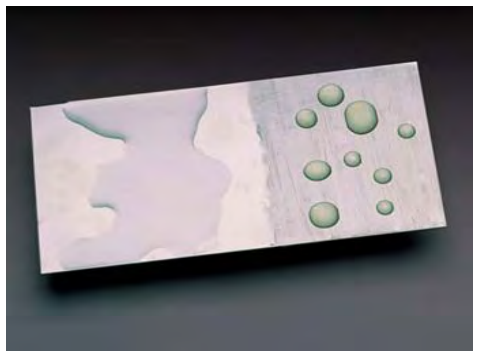
Chemical preparation for cleaning

- Alkaline detergents,
- Acid detergents,
- Chlorine disinfectants.

Raw milk quality: Bacteria number

Cleaning chemicals

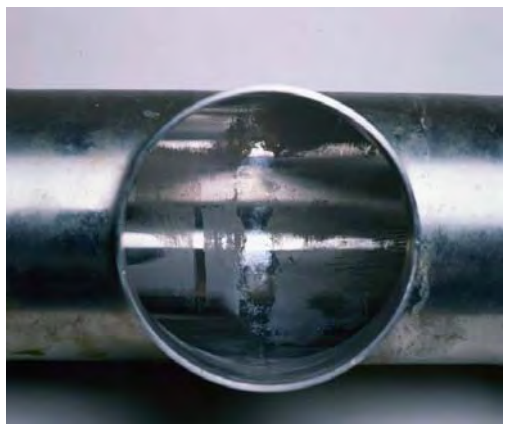
Alkaline detergents – are used for removing the layers from fats – proteins which are deposited on surface of milk tanks and other equipment! In deficit of other alkaline detergents, most simple alkaline remover of grease is sodium hydroxide, which is used as a 1-2% solution .



Raw milk quality: Bacteria number

Cleaning chemicals

Acid detergents -are used for removing mineral layers and milk stone from surface of milk tanks and other equipment. The milk stone is as a result of mineral, fat and proteins depositing in few laminate on equipments which are often in contact with milk.



Raw milk quality: Bacteria number

Cleaning chemicals

Chlorine disinfectants –are used for elimination of bacteria which are not removed from surface of milk tanks and other equipments with alkaline and acid detergents. Because the sophisticated alkaline and acid detergents contains chlorine disinfectants, usually is not necessary usage of chlorine disinfectants.

Raw milk quality: Bacteria number

PROCEDURES FOR MILK EQUIPMENT CLEANING:

- Rinse with cool or tap water (30-35 °S),
- Wash up with alkaline detergents or sodium hydroxide (65-70 °C),
- Wash up with cool or tap water,
- Disinfect with chlorine disinfectants,
- Rinse with cool or tap water.

These procedures for washing of milk equipment are applied after each usage !

Raw milk quality: Bacteria number

PROCEDURES FOR MILK EQUIPMENT CLEANING:

Storage of milk equipment until the next usage

The clean tanks, are stored turned over on a clean and dry surface, until they are drained and dried. Is not correct to put milk equipment on the floor.

Cleaning of milk strainer

After each usage, the straining canvas must immediately be washed and boiled. If other types of strainer are used, procedure for cleaning is same as for the milk equipment.

Raw milk quality: Bacteria number

PROCEDURES FOR MILK EQUIPMENT CLEANING:

Washing with acid detergents

- To be used 1 to 2 times per week for removing milk stone.
- They are used same as an alkaline detergents.
- All surfaces that were in contact with raw milk, should be brushed (with special brush) 7 to 10 minutes with 0,5-1% worm water (more then 65 °S) solution of acid detergents.

Raw milk quality: Bacteria number

- **How the farmers may reduce total bacteria number into the raw milk?**

6. With regular washing of rubber parts from milking equipment !

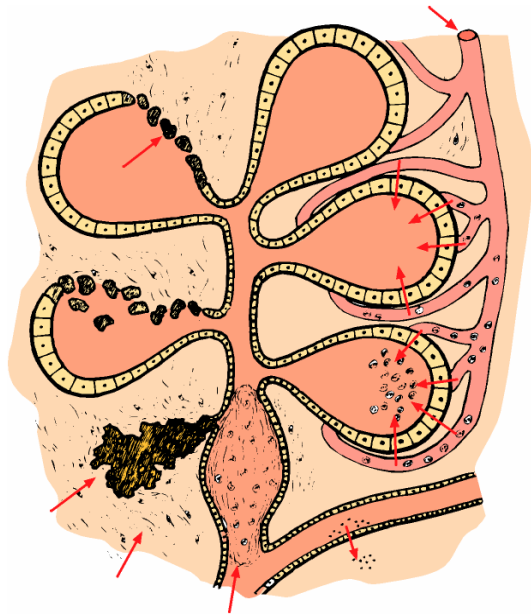
RAW MILK QUALITY

Second criteria:Number of somatic cells

Raw Milk Quality: Number of somatic cells

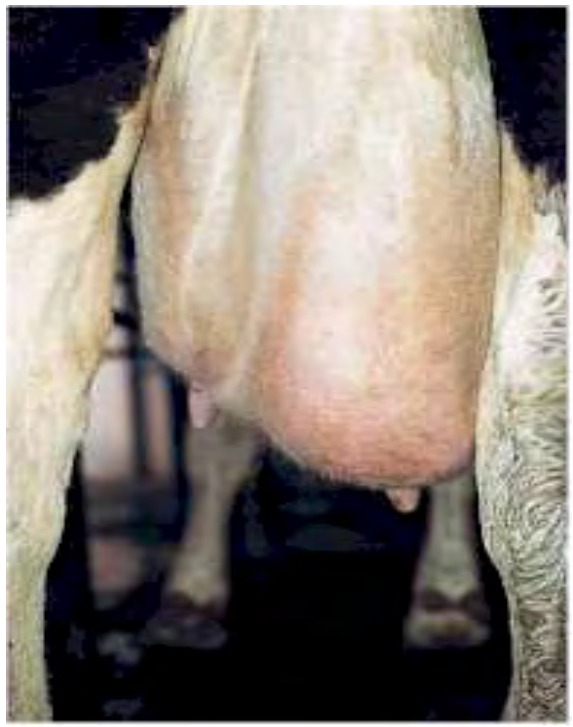
Somatic cells?

- The total number of somatic cells includes white blood cells and epithelia cells from gland epithelia of udder.
- The total number of somatic cells = total number of somatic cells in 1 ml raw milk.
- The total number of somatic cells is in direct connection with the health condition of the udder.



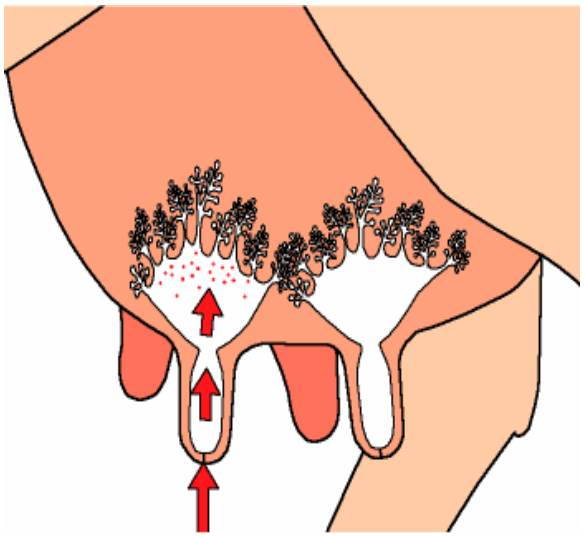
Raw Milk Quality: Number of somatic cells

- In the healthy udder the number of the somatic cells in the raw milk is reaching 200000/ml of raw milk.
- In the raw milk from udder with mastitis the number of somatic cells can reach million in 1 ml of raw milk.



Raw Milk Quality: Number of somatic cells

What is mastitis?



Mastitis = infection on udder

Clinical and sub clinical mastitis:

Clinical mastitis

Characteristic and obvious changes in the physical condition of the raw milk and udder.

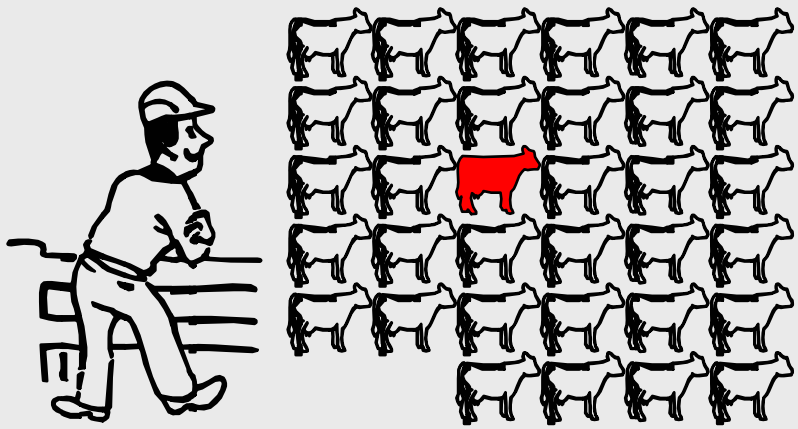
Subclinical mastitis

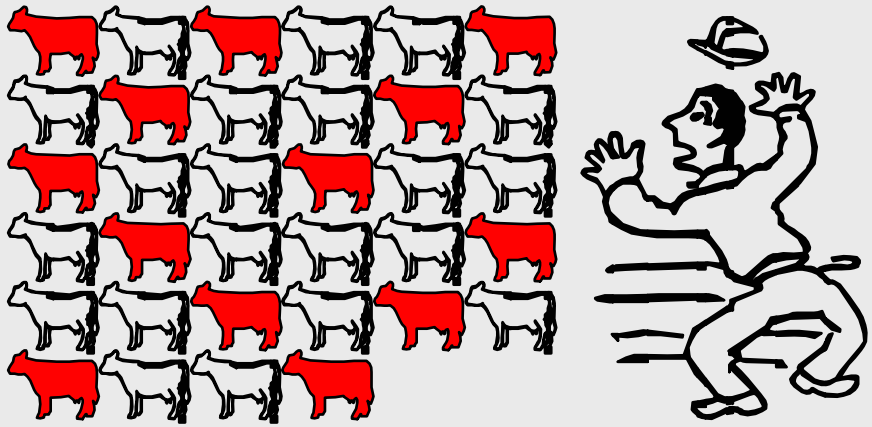
The signs of the illness are not noticeable except the low production of the raw milk.

There is a need of additional testing in order to determine the problem.

Raw Milk Quality: Number of somatic cells

When the farmer can count all known cases of clinical mastitis in the herd, it will look like this picture…





But, if the farmer can see cases of clinical and sub clinical mastitis together, then the herd will look like this picture:

Raw Milk Quality: Number of somatic cells

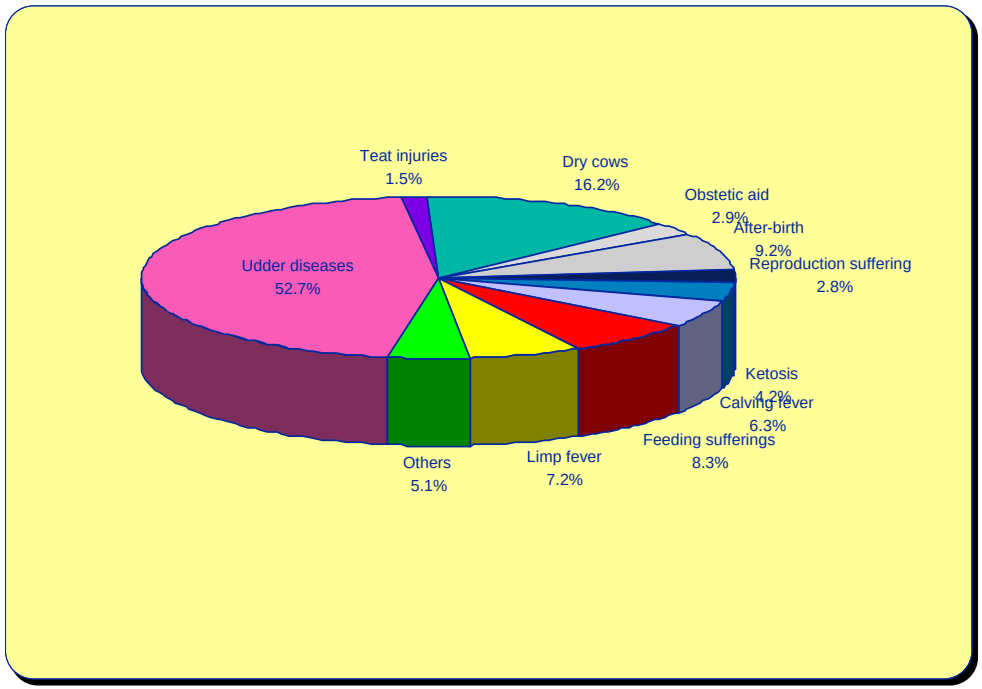
- **How farmers can to diagnose sub clinical mastitis?**

With so - called „ mastitis tests“!

Raw Milk Quality: Number of somatic cells

- Mastitis is the most spread diseases with biggest expenses (costs) at dairy cows:

Udder diseases	52.7
Teat injuries	1.5
Dry cows	16.2
Obstetic aid	2.9
After-birth	9.2
Reproduction suffering	2.8
Ketosis	4.2
Calving fever	6.3
Feeding sufferings	8.3
Limp fever	7.2
Others	5.1



Raw Milk Quality: Number of somatic cells

- **What are the real costs at mastitis?**

  - The analysis show that 53% from all dairy cows, can be affected by mastitis once per year .
  - In our conditions, average costs per one affected animal are 30-50 Euro.

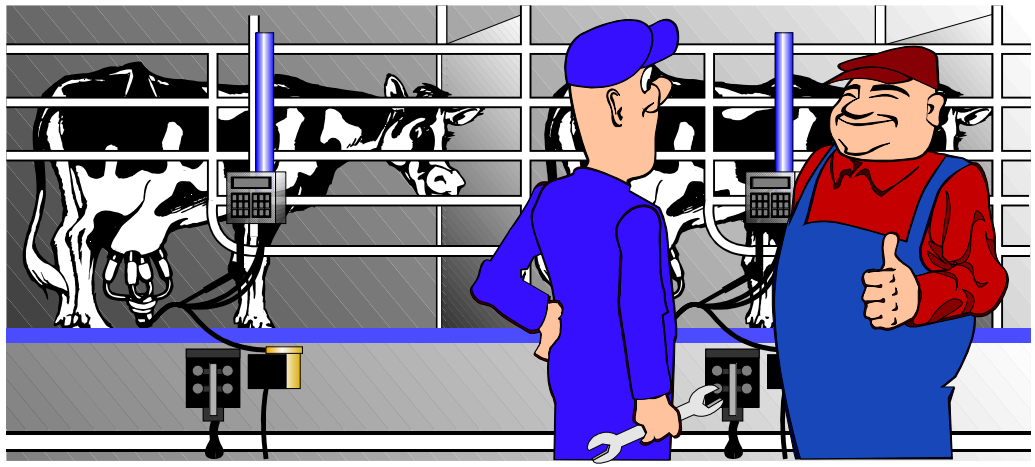
Raw Milk Quality: Number of somatic cells

- The primary mastitis consequences are – the quality and price of raw milk are reduced. Because, if the raw milk contains increased number of somatic cells, then the presence of casein are low (the quality of raw milk is unacceptable).
- The mastitis has other consequences:-production losses.

Number of somatic cells ml milk	*Production losses*	*Production losses per cow with 7000 l milk during lactation*
300.000	**7 %**	**490 kg**
400.000	**8 %**	**560 kg**
500.000	**9 %**	**630 kg**
600.000	**10 %**	**700 kg**
700.000	**11 %**	**770 kg**
1.000.000	**12 %**	**870 kg**

Raw Milk Quality: Number of somatic cells

- **How the farmers may reduce total number of somatic cells in the raw milk?**



1.With establishing of good and regular program and control procedure for milking equipment!

Raw Milk Quality: Number of somatic cells

- **How the farmers may reduce total number of somatic cells in the raw milk?**

2. With good and regular milking routine!

Raw Milk Quality: Number of somatic cells

- **How the farmers may reduce total number of somatic cells in the raw milk?**

3. The farmer must to avoid over milking or milk residue of the udder!

Raw Milk Quality: Number of somatic cells

- **How the farmers may reduce total number of somatic cells in the raw milk?**

4. With systematic usage of „after milking“ preparations!

Raw Milk Quality: Number of somatic cells

- **How the farmers may reduce total number of somatic cells in the raw milk?**

5. On beginning of the dry period farmer need to „close“ the tits!

Raw Milk Quality: Number of somatic cells

- **How the farmers may reduce total number of somatic cells in the raw milk?**

6. **If it is necessarily, affected cows must be treated with medicaments, as soon as possible!**

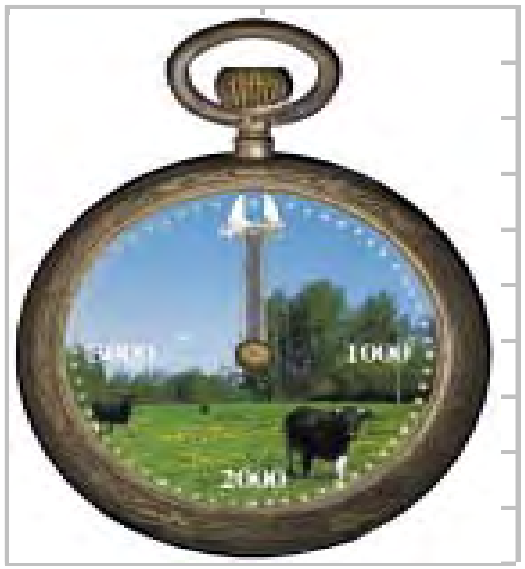
Raw Milk Quality: Number of somatic cells

- **How the farmers may reduce total number of somatic cells in the raw milk?**

7. The affected cows must be separated from the herd!

Raw Milk Quality: Number of somatic cells

- How the farmers may reduce total number of somatic cells in the raw milk?



8. With regular maintenance of the milking equipment!

RAW MILK QUALITY

Other criteria

Raw Milk Quality: Other criteria

Percentage of milk fat and proteins :

- Percentage of milk fat and proteins mainly depends from: genetic characteristics of cows, health conditions of the udder and feeding.
- Is not allowed residue of medicaments to be present in the milk!
- Is not allowed to add water to the milk!

FEEDING FOR DAIRY COWS

The structure of the meal for cows can be:

1. **Meal entirely of voluminous feed** (hay, silage, straw, meadow, green feed etc.).
   - Cows receive relatively less energy,
   - Milking is reduced,
   - Fat content of the milk is good,
   - At high productive cows it can lead to energy deficit that can cause bad fattening condition and reproductive disorder
2. **Meal with maximum 60% concentrate**
   - Improves energy supply (glucose and lactose),
   - Stimulates digestion of feed,
   - Achieves good milking, fat content and health.

Cow can receive maximum energy if the ration of voluminous feed and concentrate is around 50 : 50 (maximum 60% in fever of the concentrate).

FEEDING FOR DAIRY COWS

The structure of the meal for cows can be :

3. **Meal with more than 60% concentrate.**
   - Big risk from digestion disorder due to rough fermentation in the fore stomachs.
   - Reduces the number of microorganisms in fore stomachs, creates small amount of acidic, butter and lactic acid which can lead to acidosis.
   - Fattening condition of the cows is bad, fat content and milking is low

FEEDING FOR DAIRY COWS

Feeding of cows according to production periods

Drying off the cows

- Quality feed is withhold (Green feed and concentrate);
- Only quality hay is given;
- Water quantity is limited for a few days.

Feeding of cows during the dry off period

It is a period of high pregnancy (the last two months) when cows are not milked.

Only healthy and quality feed is use: pasture, fresh green feed (grass field, juicy plants from field), mixture of grass field (two thirds) and clover or alfalfa hay (one third), animal beet and silage in reasonable quantities (up to 10 kg a day).

FEEDING FOR DAIRY COWS

Feeding of cows according to production periods

Feeding of cows during the dry off period

Cows with medium fatness for the next lactation are prepared with the feeding consisting entirely of quality voluminous feed.

Cows with lass fatness and in lack of quality voluminous feed are fed also with concentrates (cereals, animal flour etc) In winter period it is recommended adding of variety vitamin and mineral preparations.

Good quality hay with the quantity of 2% according to body weight and 2-4 kg grains feed.

FEEDING FOR DAIRY COWS

Feeding of cows according to production periods

Feeding of cows during the dry off period

At housing system of cows in lactation during the dry off period, cows should be capped free (half- opened stable, runs, grazing).

At group keeping it is enough cows to be separate in two groups: One group of cows with poor condition and another group with medium condition because of easy programming of feeding regime.

FEEDING FOR DAIRY COWS

Feeding of cows according to production periods

Feeding of cows during the dry off period

Two weeks before bring forth a calf

- It starts with giving concentrates (in smaller amounts) and other feed that will be used during lactation period.
- The quantities of salt, calcium and phosphorus is limited in the meal to avoid swelling of the udder and lactic fever.
    1. The ratio of forage feeds: grains should be 70 : 30,
    2. The level of grains should gradually increase up to 60 : 40 during bringing forth a calf,
    3. The protein level in total meal should be 18 %.

FEEDING FOR DAIRY COWS

Feeding of cows according to production periods

Feeding of cows during lactation

There are several periods during lactation of the cows:

1. **Puerperium**
   - It is time of several days before and one week after bringing forth the calf.
   - The less amount of feed in given and usually only quality voluminous feed at will until satiation(the best quality grass field) followed by smaller amount of concentrate (0,5 - 2 kg a day).

FEEDING FOR DAIRY COWS

Feeding of cows according to production periods

Feeding of cows during lactation

2. Period of lead into lactation

- One week after bringing of the calf the period of lead into lactation starts and it lasts the next ten weeks(60-70 days). According to the high of production that animal will achieve in this period depends total results of the whole production of milk during the lactation period .
- The goal is by constant increasing of the feed quantity especially concentrate, and introducing of all feed staff that are given in that period of the year, the cow to adjust on taking maximum possible quantities of feed and by that not to lead risk to normal development of the digestion processes

FEEDING FOR DAIRY COWS

Feeding of cows according to production periods

Feeding of cows during lactation

2. Period of lead into lactation

- It is of great importance to gradually increase the quantity of concentrate (0,5 kg a day or 1 kg every second day) until the necessary or maximum allowed quantity of concentrate is achieved (up to 10 - 12 kg concentrate a day)
    1. Forage feed with excellent quality is given,
    2. The ratio of concentrate: forage should be 40:60%,
    3. Proteins in total meal should be 19%,
    4. The ration of grains: milk should be 1:3.

FEEDING FOR DAIRY COWS

Feeding of cows according to production periods

Feeding of cows during lactation

3. Period of high lactation: from 30 to 150 days

1. Forage feed with excellent quality is given,
2. The ration of concentrate: forage feed should be 60:40%,
3. Proteins in total meal should be 16-17%,
4. Grains with silage 3-4 times a day,
5. Hay should be given before the grains,
6. The ratio of grains: milk should be 1:2,5.

FEEDING FOR DAIRY COWS

Feeding of cows according to production periods

Feeding of cows during lactation

During the middle and late lactation the amount of meal should gradually decrease parallel with the decreasing of lactation but bearing that the cows should stay in medium fatness condition.

Period of the middle lactation: 150 to 250 days

- Forage feed with excellent or very good quality is given,
- The ratio of concentrate: forage feed should be 50%: 50% or 40% : 60%
- Proteins in total meal should be 14-16%
- The ratio of grains: milk should be 1:3 or 1:4

FEEDING FOR DAIRY COWS

Feeding of cows according to production periods

Feeding of cows during lactation

Period of late lactation: 250 to 305 day

- Forage feed with very good quality is given,
- The ratio of concentrate: forage feed should be50%: 50% or 40% : 60%
- Proteins in total meal should be 14%
- The ratio of grains: milk should be 1:3, if the cow is week or 1:4, if she is in good condition

FEEDING FOR DAIRY COWS

Use of vitamin- mineral preparations

- For undisturbed reproduction at animals, vitamins, especially vitamin A, D and E are essential. For cows at intensive farming the needs for vitamins are even higher.
- The amount of vitamins A, D and E in winter feeding (concentrate, hay, straw, silage) of cattle is not enough and it is one of the important deficiency of that feed. Just to compare: with few kilo of green feed cows gain enough quantity of vitamins A i E , and if they are moved in the sun, supply with vitamin D is satisfactory.
- Considering that in hay and silage as well as in the concentrate there are curtain quantity of these vitamins, there will not be symptoms of avitaminosis(vitamin deficiency) but hipovitaminosis(not sufficient quantity of vitamins) as well as fertility disorder.

FEEDING FOR DAIRY COWS

Use of vitamin- mineral preparations

- In summer period along with the ordinary feed, cows should be fed with green feed (pasture, grass field, alfalfa, clover etc.).
- In winter period starting from November until May, cows should be given vitamin A, D and E in form of injections intramuscularly on every six weeks.
- If winter way of feeding is apply even without runs, than above mentioned vitamins should be add in the concentrate and on every six weeks to be applied with the injections.

FEEDING FOR DAIRY COWS

Use of vitamin- mineral preparations

- By preventative giving of the vitamins, the total needs of cows for milk production, growing of the calf at gravid animals and basic life needs will be satisfied. This factor as a reason for infertility at cows will be eliminated hence the percentage of fertility is improve after insemination, the number of the necessary inseminations trials is decreased, the period between two calves is shortened and the number of calves is increased
- It is also recommended cows to be allowed free at run at least twice a week.

FEEDING FOR DAIRY COWS

Watering for cows

High reproductive cows from which is expected high production of milk, it is necessary to supply free approach to water, watering at will at water pints. Around 90% of milk content is water. Thus the cows need enough quantity of water to be able to produce milk.

COWS REPRODUCTION

Reproduction at farm is one of the most important factors that effects rentability and profitability of the farm. Un sucesfull reproduction can lead to:

- Enormous economic damages,
- High cost for feeding, care and breeding of the steril cows;
- Difficulties or lack of possibilitiy for gaining breeding animal, fertile bull calves and bulls for reproduction;
- Decreased milk and meat production;

COWS REPRODUCTION

Basic issues that every farmer should know regarding cows reproduction are:

- Full maturity at cows
- Estrus
- Signs of estrus
- Insemination
- Gravidity and care for cows through delivery of calf
- Care for cows after the delivery of calf
- Care for the calf after birth
- Colostrums
- Examination of the fertility of the herd
- Sterility

COWS REPRODUCTION

Full maturity at cows

- Full maturity at heifers depends on many factors among on of the most important is the breed, feeding and individual characteristics on each animal.
- Female cattle fully mature at 8-12 months and body maturity is gain on 18 months.
- In case of good care and feeding, heifers at 15-16 months reach 70% form their body development (300-350 kg) and they can be inseminated.
- For cows from Simmental and East Frisian breed the most suitable period for the first insemination is on the age of 18 months.

COWS REPRODUCTION

Full maturity at cows

- Early mating or insemination for heifers, until they reach two thirds from their body development or 15-16 months is not recommended because:
  - Early gravid heifers fall behind in the growth,
  - They have more difficult delivery of calf because the fetus is too big,
  - They have lower production of milk,
  - They are more frequently excluded because of sterility.

COWS REPRODUCTION

Estrus
(sexual receptivity or heat)

- Sex cycles at normally fed and bred cows approximately lasts 21 day (17-25 days).
- The most important phase of the sex cycles is the estrus or popularly known as sexual receptivity or heat.
- Estrus at cows lasts 6-36 hours but usually 16-24 hours.
- If the inseminated cows or bred cows do not become gravid the estrus will occur again for 21 day.
- Cows have estrus through whole year and they can be fertilized at any time of year differently than other domestic animals.

COWS REPRODUCTION

Estrus

Signs of estrus at cows

When cows are in estrus they show variety of signs by what they show the heat:

- Anxiety;
- Jumping on other cows;
- Lifting the tail;
- Sniffing other cows genitals;
- Bending the spine in loins area;
- Frequent urination;
- Bad appetite;
- Decreasing milk production;
- Red and swallow vulva;
- Clear and slimy vagina discharge that is elastic and similar to white of the chicken egg;

COWS REPRODUCTION

Estrus

- On time discovering of the estrus is one of the most important thing at the farm.
- Failure of not to discover the heat of the animals leads to expensive postponed of fertilization and by that postponing the in between calf period.
- After delivery of calf, the estrus appears often for 50-60 days. Bigger interval between delivery of calves and the appearance of the estrus after can be because of pure and inadequate feeding or breeding of cows.
- Cows dried 60 days before delivery of calf in normal conditions of feeding and breeding show estrus and become gravid up to 75 day after delivery of calf.

COWS REPRODUCTION

Estrus

- Fertility of cows is bigger at second and third estrus after delivery of calf than at first, fourth and fifth estrus Later estrus are less fertile.
- The biggest success in insemination can be achieved on 45-60 days after delivery of calf.
- If cows are not gravid in first 3 month after the delivery of calf, it will bi more difficult to became gravid later, especially 6-10 months after delivery of calf.
- It is recommended from agriculture economic point of view that the insemination of cows be performed 75-80 days after delivery of calf.

COWS REPRODUCTION

Artificial inseminations

Important advantage during the artificial insemination at dairy cattle is:

- Wider use of bulls with top characteristics that can improve the breed,
- Decrease the risk of sex deceases,
- Lowering the costs that would appear when buying and breeding high quality bull

COWS REPRODUCTION

Gravidity- care for cows during delivery of calf

Gravidity at cows usually lasts 281-290 days (9 months).
After 9 months gravidity, the signs of closing the delivery can be notice. Some of the signs are:

- Loosing the tissue from both sides near the tail;
- Swallowing of the vulva;
- Leaking of clear and thick discharge from vagina;
- Filling the udder with milk;
- Loosing appetite;

COWS REPRODUCTION

Gravidity- care for cows during delivery of calf

During preparation for delivery of calf the farmer should do the following:

• The cow should be separated from the herd a few days(2-3) before delivery of calf and to be put in breeding pen for that purpose which previously will be prepared on the following way:

- Complete removal of the old litter and all debris;
- Thoroughly cleaning and sanitizing with 2% solution of sodium hydroxide (on 10 l water 200 gr of sodium hydroxide added and it is sprayed with using spraying pump);
- Big amount of clean and dry straw is put on the dryied pen;

COWS REPRODUCTION

Gravidity- care for cows during delivery of calf

- Proper ventilation in the stable should be provided. It is desirable to have more fresh air but not draught. This is very important for keeping the health of the cows and calves. Inhaling moist air saturated with ammoniac and other harmful gases that are present in the stable can seriously decrease body resistance.
- Most cows deliver the calf without any help but for some assistance is necessary. A help from a vet is needed at difficult delivery, in cases of first delivery and older cows and especially for high valuable breeds.

COWS REPRODUCTION

Care for cows after dalivery of calf

- Delivery of a calf and sudden start of high milk production is a big stress for the cow. In this period she is vulnerable to infections and disorders, such as mastitis (udder inflammation), withholding the placenta with additional complications and metabolism disorders (milk fever, ketosis etc).
- Providing clean and comfortable pen is important for decreasing the stress level during delivery.
- The cows should be enable to stay in the pen where she deliver the calf at least one day after delivery but if she is healthy than not to be isolated from the herd for longer period of time.
- The pen should be cleaned and sanitized with 2% of sodium hydroxide after every use.

COWS REPRODUCTION

Care for calf after birth

- The first days after the birth are the most critical period from the life of new born calves. The better conditions in the environment the bigger the chances of the new born calves to survive.
- Navel string is usually break off by it self during delivery. If it does not happen the farmer should do that with sterile scissors or sterile knife (boiled in water for at least 30 minutes). The navel string should be cut 5-10 cm from the body of the calf. Than it is very important that it is dipped in 2% of iodine tincture. If there is bleeding it is recommended to tide up the conjunction with sterile fiber and to be dipped in iodine tincture.

COWS REPRODUCTION

Care for calf after birth

- Immediately after birth, the cow usually licks the calf. This helps in drying of the calf and it stimulates bloodstream and breathing of calf. If the cow is not licking the calf then the farmer should clear its nasal holes and mouth and thoroughly rub and dry it with the clean towel or straw.
- The calf should be put in clean and dry litter (dry and clean straw). If the weather is cold the calf may be cover with blankets in order to keep him worm.
- Most of healthy calves stand on their feet within 30 minutes and start with sucking one hour after the birth. Before sucking is allowed the nipples and udder of the cow should be washed and cleaned with 2% solution of chlorine.

COWS REPRODUCTION

Colostrum

Colostrum (rennet) is the first milk that cow is excreting after the delivery of calf.

Comparing with the normal milk, the colostrum contents more dry matter: vitamins, proteins and its most important ingredients are the antibodies which protect the body from various deceases. By giving the colostrum to the calf quickly, the possibility of its survival substantially increases.

A few hours after birth, the body of a calf losses the acceptance of the body to antibodies from the colostrum. That is way it is of big importance for calf to drink the colostrum in the first hour after birth.

COWS REPRODUCTION

Colostrum

- The quantity of colostrum that calf should drink is around 6% from his body weight.
- The content of the colostrum changes rapidly and it is transformed in to normal milk within 24 hours after the delivery of calf.
- Calves that receive enough colostrum on time will have significantly lass mortality and health problems that the ones that did not receive it or receive it latter.
- The farmer should help the calf to suck the colostrum from the cow or to give to the calf freshly milked or stored colostrum using nipple.
- In the first 24 to 36 hours it is desirable for calves to be separated from their mothers and to be fed by nipples or baskets. If the calves are left with their mothers they can suck too mush milk and get diarrhea.

COWS REPRODUCTION

Testing the fertility of the herd

Do you have problems with the reproduction in the herd and in what amount is this problem present at the farm can be find by testing the fertility of the herd. Parameters that can determine fertility of the herd are:

Period beetwen two deliveries- The rentability of a fram depends on length betwenn two delivery. Fertulity is higher if this period is shorter. The main thing is that this period shpuld not be longer than 365 days hence cow should deliver calf every year.

Total fertility- every cow approximately gives 4,5 calves before it is excluded from the herd. On 100 calves there is 1,5 dead calf and 0,9 abortions.

Length of service period- it is a period between delivery of calf and repeated fertilization. If this period is shorter, than the period between two delivery is shorter and fertility and milk production are higher. In our country cows are inseminated 45-90 days after delivery.

COWS REPRODUCTION

Testing the fertility of the herd

Insemination index- fertility of cows can be seen also from the average number of insemination necessary for fertilization. The percentage of fertilization from the first insemination is average 65%, and the average number of mattes per cow with bull desirably should be 1.2 - 1.5. If the index is 2 for the whole herd than is marked as decreased fertility.

Interval between two estruses- the period of the full sex cycles is average 21 day and the regularity of this period is important for testing the fertility of the herd.

If you have pure fertility of the herd, usually it is not because one reason but sum of many factors that are called Herd Sterility

COWS REPRODUCTION

Sterility

Sterility at cows can be seen from:

- Absence of estrus;
- Inability for fertilization;
- Irregular and late fertilization with prolonged period between delivery;
- Abortions or delivery of undeveloped calves;
- Delivery of calves not capable for living and die very fast;

Sterility at cattle may be **periodical** or **permanent**, **inherited** or **earned**. Earned sterility appears more often (70-80%) than inherited one(20-30%).

COWS REPRODUCTION

Sterility

Earned sterility is due to:

- Factors of feeding,
- Undesired living conditions,
- Bioclimatic factors,
- Local infections of the genitals,
- General pain that can disorder genital functions (metabolic diseases, infection's diseases, diseases cause by parasites)

Inherited sterility appears because defects or developing anomalies of the genitals.

The sterility can be cause by combine activity of above mentioned external an inherited factors.

COWS REPRODUCTION

Sterility

Sterility have economic, agriculture and professional meaning.

Economic- it consist of causing enormous economic damages and lost in livestock breeding (decreased reproduction) that objectively is bigger than any other damages cause by diseases, infective, internal and diseases cause by parasites together.

Agriculture- difficulties or impossible production of breeding animal, fertile bull calves and bulls for reproduction and lower milk and meat production;

Professional- its frequency, difficulties in diagnosis, healing and prevention.

Sterility factors at cows depending from farmers responsibility

Breeding

- The breeding and care for the cows are important factor that affects the health, fertility and milking of the cows.
- For gravid animals the most important are run, movement and pasture. Not sufficient moving and little sun leads to deficit for vitamin D and disorder of the internal secretion of the glands and by that lower fertility.
- Development of the sex cycles is better performed at the loose system than the close one. If there is no possibility for loose system it is necessary that the cows should be let at run at least twice a week.

Sterility factors at cows depending from farmers responsibility

Breeding

- Daily moving of the cows increases fertility because it activates the organism and the signs of estrus are more clear and noticeable. The farmer will notice the signs faster and can inform the vet who will perform the insemination. Cows should be let free 1-3 hours a day.
- In summer period gravid cows should be protected from high external temperature. They should be provided with shadow and water sprinkling.
- The most suitable temperature in the stable for the European breeds is 10 C° to 18 C° with relative humidity of 70%. The highest allowed variations of the temperature for cows are-12 C° to 21 C°. Too low and too high temperature decrease the fertility and milk production.

Sterility factors at cows depending from farmers responsibility

Breeding

- There should be enough clean air, lightening and reasonable temperature in the stables. Hot and moist air effects the growth of microorganisms and by that deceases on respiratory organs. Air moisture in the cattle stables must not exceed 70%
- It is very important that the pans for cows are comfortable and allow full and undisturbed rest.

Sterility factors at cows depending from farmers responsibility

Evidential for the estrus

If evidential exists on the previous estrus for each cow than the next estrus can be predicted approximately correct.

When there is evidential for the estrus, near the date characteristics of the estrus are recorded, in short which signs occurred and were they well expressed, because most probably that they will be the same at the next estrus.

Sterility factors at cows depending from farmers responsibility

Evidential for appearance of the estrus

- The first signs of estrus after the delivery of calf appear in 30-90 days(approximately 50-60 days) and then is repeated on every 21 day (+/- 3 days).
- If the cow is inseminated within 85th day after the delivery, one delivery per year is achieved which is the goal on every farm.

Sterility factors at cows depending from farmers responsibility

Registration of estrus

- Registration of estrus by the farmer is not always on time and by that, the insemination by the inseminator.
- Often the most important factor for low percentage of gravidity is incorrect time for insemination. Cows are inseminated only when they are in estrus but it is not the same whether it is at the beginning or at the end of estrus because cows are not equally fertile during the estrus.

Sterility factors at cows depending from farmers responsibility

Registration of estrus

- The most suitable moment for insemination is 13-16 hours, maximum 18 hours since the estrus. At 75% of cows the signs of estrus are shown at night or early in the morning. Because of this, cows that showed signs in the morning are inseminated at night and cows that shown signs in the afternoon are inseminated the next morning.
- For some cows there is an exception from this rule and if it is noticed that the cow is not gravid (although it is inseminated in recommended time), wais solution will be insemination to be performed 2-3 hours earlier or later than the ordinary time. If this results with gravidity then it should be noticed because it is possible the same cow to beehive similarly in the next estrus cycles.

Sterility factors at cows depending from farmers responsibility

Registration of estrus

- **The farmer or the staff that works on the farm is responsible two to tree times a day to observe the cows on signs of estrus. That is most suitable to be performed during the feeding of the animals.** If a cow is notice to have signs of estrus it is necessary to inform the vet on the time when the signs are noticed**.**

Sterility factors at cows depending from farmers responsibility

Insemination

Success in insemination, if other factors fro sterility are excluded primarily depends on the person that is performing the insemination.

Sterility factors at cows depending from farmers responsibility

Every farmer in a pen above each cow should have hanging table where he can write the following data:

1. Number of the cow: (number of the cow is recorded),
2. The cows has delivered calf: (the date is recorded),
3. The cow has been in estrus/ inseminated: (the date and if the estrus was seen before or in the afternoon is recorded),
4. Milking, fat content and protein level: (how much liters and the % of milk fat and proteins is recorded),
5. The quantity of concentrate: (the quantity of concentrate is recorded),
6. Healing data: (the medicine and date when it started to be given is recorded),
7. Data for healing of the udder: (the nipple that is under therapy is recorded):